Permanente Creek Planning Study

(Portland Avenue to Hale Creek and Permanente Diversion Channel)

consisting of

Final Engineer's Report

May 1979

Santa Clara Valley Water District

5.400-2

Santa Clara Valley Water District

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600

May 2, 1979

Honorable Board of Directors
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Dear Board Members:

Transmitted herewith is the Final Engineer's Report for the proposed Flood and Erosion Control Measures for Permanente Diversion Channel and Permanente Creek from Portland Avenue to Hale Creek, Project Nos. 1023 and 1024. This project is within the City of Los Altos, City of Mountain View, and the County of Santa Clara in the Northwest Flood Control Zone of the Santa Clara Valley Water District.

This report describes the recommended flood and erosion control project. The recommended project consists of constructing an additional pipe culvert at Altamead Drive, some modifications at the diversion point and at the entrance to the box culvert under SR 85, replacement of the existing Marilyn Drive box culvert, erosion control works at a few locations on Permanente Creek between St. Francis High School and Marilyn Drive and flood proofing measures around the El Camino Hospital. Cost of the project is estimated to be $964,000, of which approximately $119,000 will be for constructing the flood proofing measures at the hospital. The cost of protection at the hospital will be repaid by the hospital in accordance with an agreement to be worked out between the District and the hospital. Funds are available in the Northwest Zone reserves to finance the recommended project.

The proposed project will increase the flood protection level from the current 12-year level to more than 100-year level for El Camino Hospital and to 25-year level for the remaining urban areas. To provide the full one percent flood protection, it would be necessary to build additional measures, such as flood detention ponds, when funds become available. These additional measures are not justifiable at this time.

The proposed project will not have any significant environmental impacts. A Negative Declaration to that effect has been included as an Appendix A of this report.

I concur in the project, as proposed, and recommend that a public hearing be held as a prerequisite to the construction of the project.

Sincerely yours,

John T O'Halloran

John T. O'Halloran
General Manager

Attachment

AN AFFIRMATIVE ACTION EMPLOYER

TC425P47 1979 c.3

SANTA CLARA VALLEY WATER DISTRICT

ENGINEER'S REPORT FOR THE PERMANENTE CREEK PLANNING STUDY (Portland Avenue to Hale Creek and Permanente Diversion Channel)

PROJECT NUMBERS 1023 and 1024

Report prepared by Design and Construction Unit Staff

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May 1979

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PREFACE

Flooding from Permanente Creek between Portland Avenue and Hale Creek and ~~the Permanen~~te Diversion Channel presents a significant problem for portions of the Cities of Los Altos and Mountain View. Therefore, in 1977, a planning study was undertaken to determine in detail the magnitude of the flooding and erosion problems and to recommend a project that would eliminate or minimize these problems.

This report presents the results of this planning study. The report is divided into eight sections as follows: 1) Summary, 2) Introduction, 3) Problem Description, 4) Alternative Solutions, 5) The Proposed Project, 6) Conclusions and Recommendations, 7) Detailed Plans, and 8) Appendices. The summary is a concise overview of the study and proposed project. The remainder of the report provides a detailed discussion of the problems, the alternative solutions, and the proposed project. The project was selected on the basis of engineering and environmental analyses of several alternatives, and input received from the community.

This report is being circulated to interested parties for review and comments. It is also on file at the Los Altos and Mountain View public libraries. After the review period, the District Board of Directors will receive comments on the proposed project at a Public Hearing. The Board has set June 13, 1979 as the date for this Hearing. The Hearing will be held in the City Council Chambers, located at 540 Castro Street, Mountain View. After this hearing, the Board will either approve or disapprove the project. If the project is approved, final design of the recommended improvements will follow. Construction of some of the proposed project elements may occur during fiscal year 1979-80.

If you have any comments or questions regarding this study, please attend the Public Hearing or call or write Joe Pandit, Project Engineer, Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose, California 95118.

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SHEET

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SUMMARY

This report presents the results of an investigation of the existing and potential flooding, erosion and sedimentation problems on Permanente Creek between Portland Avenue and Hale Creek and also along the Permanente Diversion Channel. These channels are in the Northwest Flood Control Zone of the District and affect portions of the Cities of Los Altos and Mountain View. The report also presents a description of the alternatives studied, the proposed project, and the impacts of the proposed project.

Historically, some areas near El Camino Real were flooded during the floods of 1955 and 1958. To reduce the flooding in this area, the Permanente Diversion Channel was constructed in 1960. This channel diverts moderate flows from Permanente Creek to Stevens Creek; however, it is not large enough to contain the more severe floods such as the one percent or 100-year event. The present maximum capacity of the creek and diversion system is equivalent to a 12-year flow. Therefore, during the one percent flow event, significant flooding would occur; about 465 homes, two schools, and El Camino Hospital would be subject to flooding. The damage from such a flood is estimated to be 44 million dollars.

In addition to the flood problem, some erosion, sedimentation, and maintenance problems also exist within the study area.

During the planning study, the following alternatives were analyzed as possible solutions for the problems described above: 1) Provide flood-related emergency measures, but no construction work. 2) Enlarge the existing Permanente Diversion Channel to contain the one percent flow. 3) Modify the diversion channel and the creek at a few locations and construct upstream flood detention ponds to contain the one percent flow. 4) Construct another

diversion channel to Stevens Creek in the upper watershed to divert the flows in excess of the capacity of the downstream facilities.

The first alternative, although the least expensive, was not acceptable because it would not significantly reduce the flood damages. Alternative 2, enlargement of the existing diversion channel, or Alternative 4, construction of the new diversion channel, would cost more and transfer substantially more water to Stevens Creek, which is already under capacity. After weighing all the factors, Alternative 3 was selected as the preferred alternative. This plan would cost less, has recreation potential, and would probably have only a few significant adverse environmental impacts. It would, however, result in a small increase in the flow in Stevens Creek, downstream of the existing Permanente Diversion Channel.

This alternative would consist of two major elements: 1) Modifications to the creek and the diversion channel and 2) construction of two reservoirs. The cost effectiveness of these elements was evaluated to ensure the best use of public funds. This evaluation indicated that the proposed modifications to the creek north of Portland Avenue and to the diversion channel would have the highest cost effectiveness, but the additional construction of the two flood detention ponds would have a much lower cost effectiveness and could not be justified on the basis of additional benefits. Therefore, only the creek and diversion modifications plus flood proofing measures at the El Camino Hospital, were selected as the proposed project. The proposed reservoirs were dropped at this time. The creek modifications alone would increase the flood protection from the present 12-year level to a 25-year level in the area north of Portland Avenue. The hospital flood proofing would provide a one percent level of protection for that facility.

The proposed project is estimated to cost $964,000 in 1979 dollars. Table 1 provides the details of the proposed work and the corresponding costs. The project is planned to be built within a year or two from the date of approval of the Engineer's Report. Funds are available to build the proposed project. Costs of flood proofing measures around the El Camino Hospital will be initially paid by the District and will be repaid by the hospital at a later date.

The two detention ponds, which are not a part of the proposed project, would cost about 2.74 million dollars at 1979 prices. These ponds may be built in the future when the funds become available and the benefits justify the work. If built, these ponds would increase the flood protection to at least the one percent level for the entire study area.

Table 1

THE PROPOSED PROJECT

A.	Improvements between Portland Avenue and the Diversion Pipe	
	1. Concrete lining of the existing 600-foot-long earth channel between Portland Avenue and Stream Gage Station 32A	$212,000
	2. Access ramps just north of Stream Gage Station 32A	83,000
	3. Modifications to the diversion structure	6,000
	4. Miscellaneous construction	3,000
B.	Diversion Channel - Improvements near Altamead Drive Box Culvert and Grant Road	
	1. Additional 6.0-foot-diameter, 800-foot-long pipe and transitions at Altamead Drive	267,500
	2. 3.5-foot raising of concrete lining 200 feet upstream of Altamead Drive	38,000
	3. Miscellaneous construction near Altamead Drive box culvert	15,000
	4. Access ramp west of Grant Road	58,000
C.	Modifications to Entrance Channel to Concrete Box under Highway 85	25,000
D.	Improvements along Permanente Creek	
	1. Marilyn Avenue bridge replacement	69,500
	2. Erosion control works between St. Francis High School and Hale Creek	58,000
E.	Flood-Proofing Measures around El Camino Hospital	119,000
F.	Right of Way Acquisitions	10,000
	GRAND TOTAL	$964,000

INTRODUCTION

This section of the report presents the characteristics of the watershed and the study area, previous studies, the objectives of the current planning study, and the details of public participation in the study.

The Watershed

Permanente Creek Watershed is located in the northern portion of Santa Clara County and is within the Northwest Zone of Santa Clara Valley Water District. Portions of the watershed fall under the jurisdiction of the cities of Palo Alto, Los Altos Hills, Cupertino, Los Altos, Mountain View, as well as the County of Santa Clara.

The creek originates at an elevation of about 2,650 feet MSL in the Monte Bello Ridge area and flows eastward for about three miles and then northward to San Francisco Bay. Two major branches of the creek, the north fork and the south fork, join near Highway 280. Two watercourses join Permanente Creek in the reach north of Highway 280 - Permanente Diversion Channel and Hale Creek.

Figure 1 is a map of the area drained by Permanente Creek (the watershed). The total area drained upstream of the junction with Hale Creek is about 10 square miles. At the point where the creek enters San Francisco Bay, it drains about seventeen square miles.

The average annual rainfall in the upper watershed varies from about 33 inches in the ridge areas to 20 inches near the foothills. In the lower watershed, the average annual rainfall is about 15 inches. A maximum of six inches of rainfall in 24 hours was recorded in 1967 at Dahl Ranch rain gauge station.

The areas in the watershed south of Highway 280 are primarily in a natural state. Several landmarks, such as Kaiser-Permanente Cement Plant, St. Joseph Seminary, Maryknoll Seminary, and Gate of Heaven Cemetery, are located in this upper waterhsed. The area north of Highway 280 to Bayshore Freeway is a

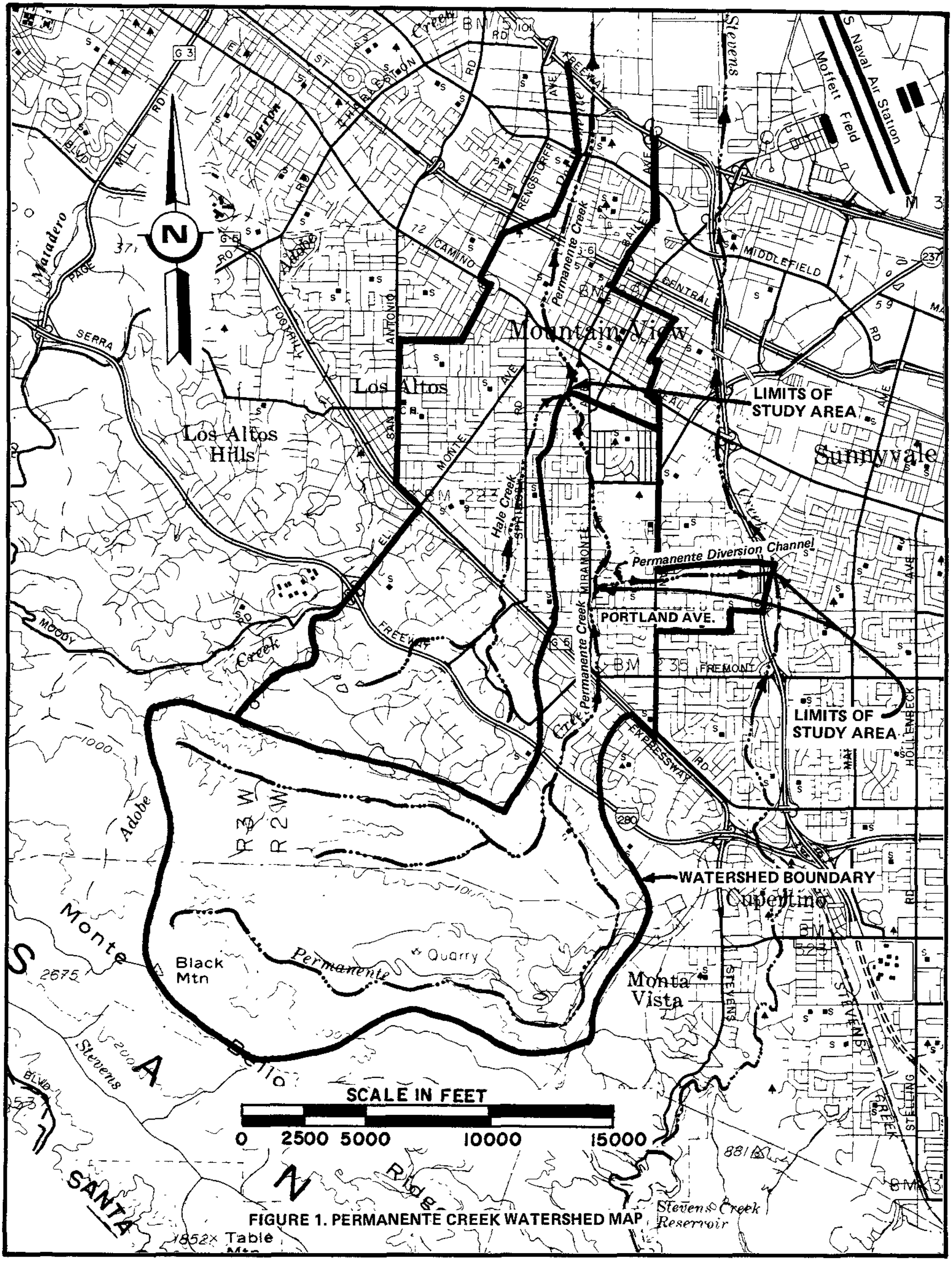


FIGURE 1. PERMANENTE CREEK WATERSHED MAP

highly urbanized residential area with scattered pockets of commercial areas. North of Bayshore Freeway, the area is only sparsely developed and is partly zoned light industrial and commercial by the City of Mountain View. The City is also developing Shoreline Park near the outlet of Permanente Creek at San Francisco Bay.

The Study Area

The study area is located in the cities of Los Altos and Mountain View (see Figure 1).

This flood control planning study covers the portion of Permanente Creek from upstream of Portland Avenue to Hale Creek near Mountain View Avenue. It also includes the Permanente Diversion Channel which starts at Miramonte Avenue and runs easterly, parallel to Eastwood Court, Altamead Drive, and Preston Drive to Stevens Creek.

The creek upstream of Portland Avenue is adequate to carry one percent flows without flooding. Erosion and sedimentation problems in this reach are controlled through the District's regular maintenance program where the District has a right of way. Therefore, the upstream reach was not included in this study.

The creek below the confluence with Hale Creek is inadequate to carry one percent flows and would be covered in a separate planning study in the future, probably in conjunction with a study on Hale Creek.

The study area primarily consists of residential developments, commercial areas, a park, five schools, and El Camino Hospital. Nine bridges cross Permanente Creek and three bridges cross Permanente Diversion Channel. Two culverts, about 780 feet long at Altamead Drive and 210 feet long under Highway 85, are also located on the diversion channel. The culvert under Highway 85 discharges into Stevens Creek.

Streamside Visual Conditions

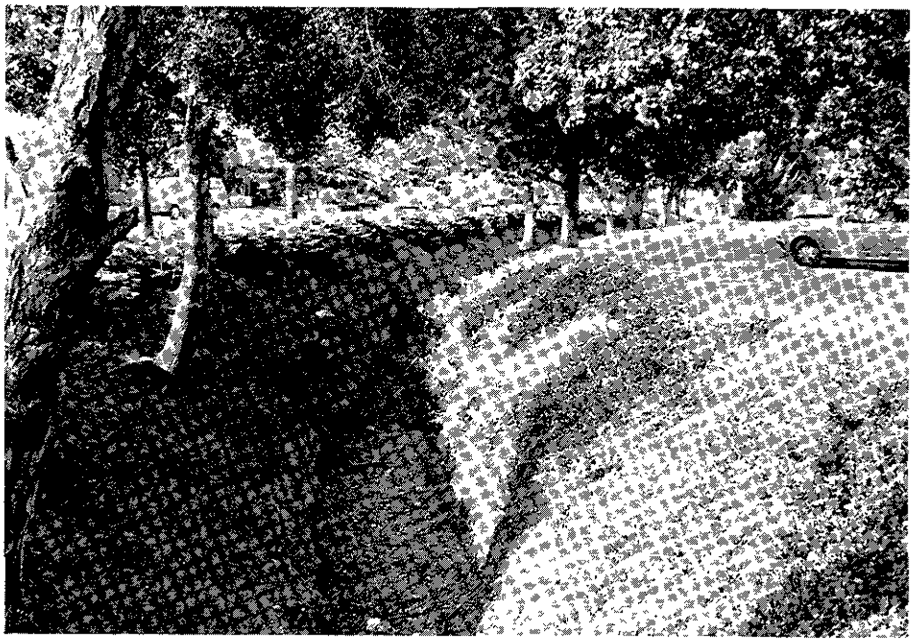
The creek, from the diversion channel to St. Francis High School and from downstream of Cuesta Avenue to Hale Creek, is in a natural, undisturbed condition and has excellent scenic values. However, the stream reaches between Portland Avenue and the stream gauge station at Berry Avenue and the reach adjacent to St. Francis High School are modified earth channels and lack natural amenities. The Permanente Diversion Channel is a concrete channel and has a sterile appearance. In most areas, wooden or chain link backyard fences border the creek and the diversion channel. There are several storm outfalls into both the creek and the diversion channel. A few subdivisions bordering the creek are under construction.

Figures 2A, 2B and 2C present the existing visual conditions along the creek and the diversion channel within the study area.

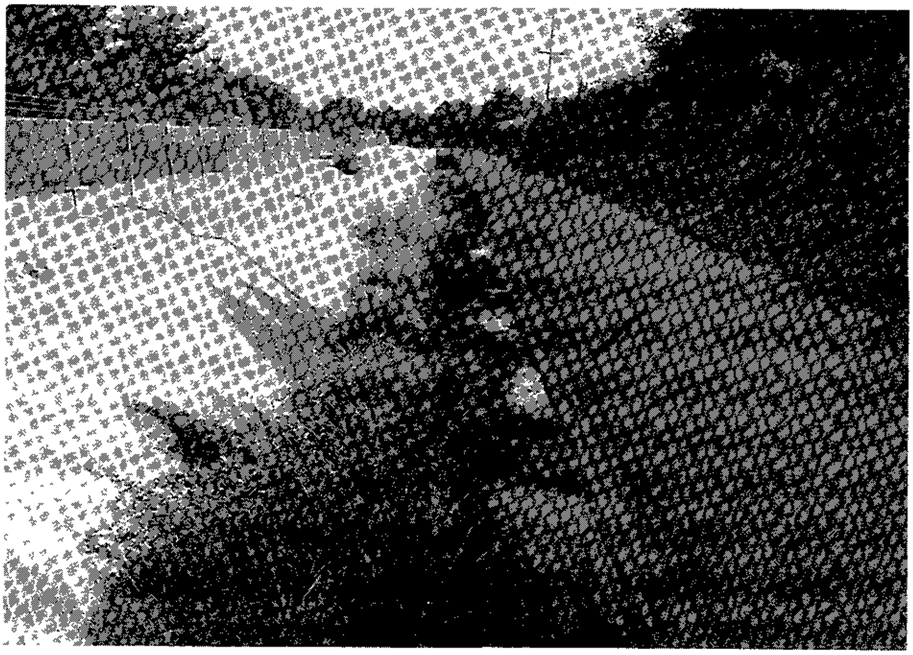
Streamside Biological Conditions

The downstream portion of the reach between Portland Avenue and Eastwood Place is a concrete-lined channel; the upstream portion is an excavated earth channel. Some weeds and native plants have temporarily established in the silt accumulated in the concrete-lined bottom. The earth section supports a variety of common weeds; no shrubs or major trees are present. The side slopes in the earth section are essentially without riparian vegetation.

The reach between Eastwood Place and Covington Road is a nearly pristine mature riparian corridor characterized by many very large coast live oaks. A good selection of other climax stage successional plant species is also present, including California bay, bigleaf maple, and Oregon ash. The tree canopy is somewhat less dense, which allows a ground cover of herbs and grasses to grow. A number of backyard escapes such as English ivy and periwinkle, cover the channel slopes in some areas. Many large coast live and valley oak trees dominate this reach; a number of other tree species are also present, including black locust, coast redwood and California buckeye.

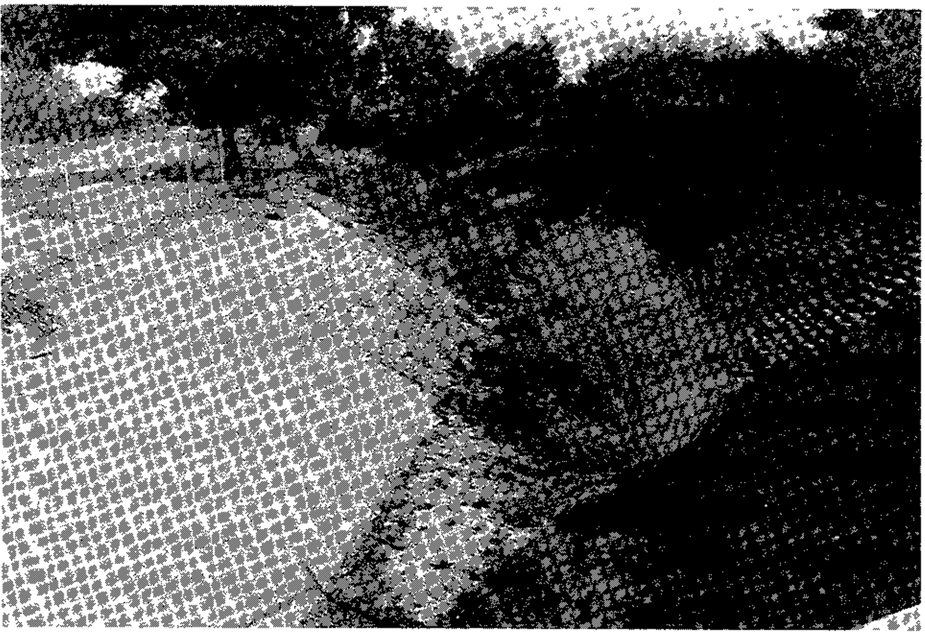


Permanente Creek near St. Francis High School

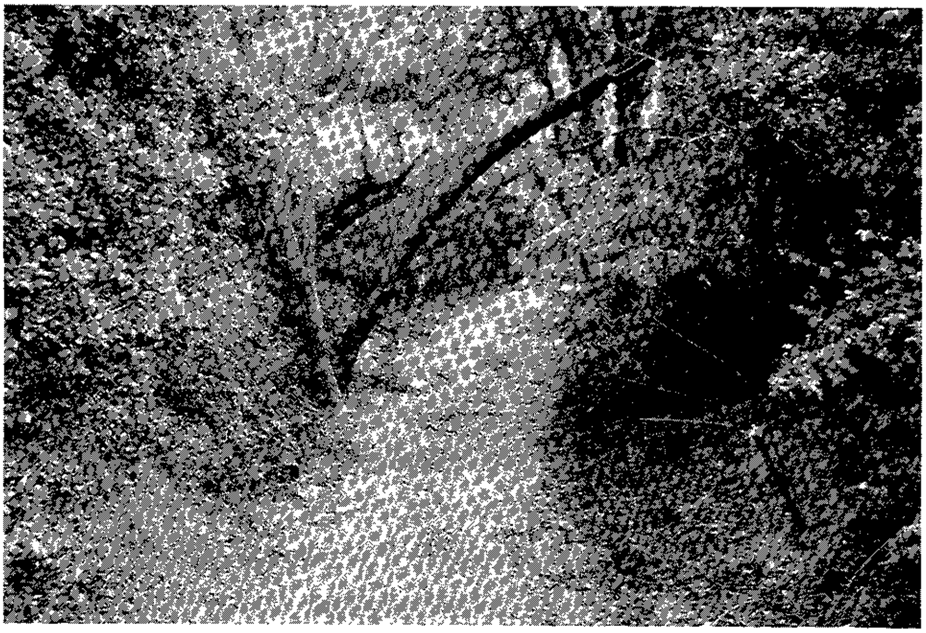


Looking Downstream along Diversion Channel from Diericx Drive

Fig. 2A-VISUAL CONDITIONS ALONG THE CREEK AND THE DIVERSION CHANNEL

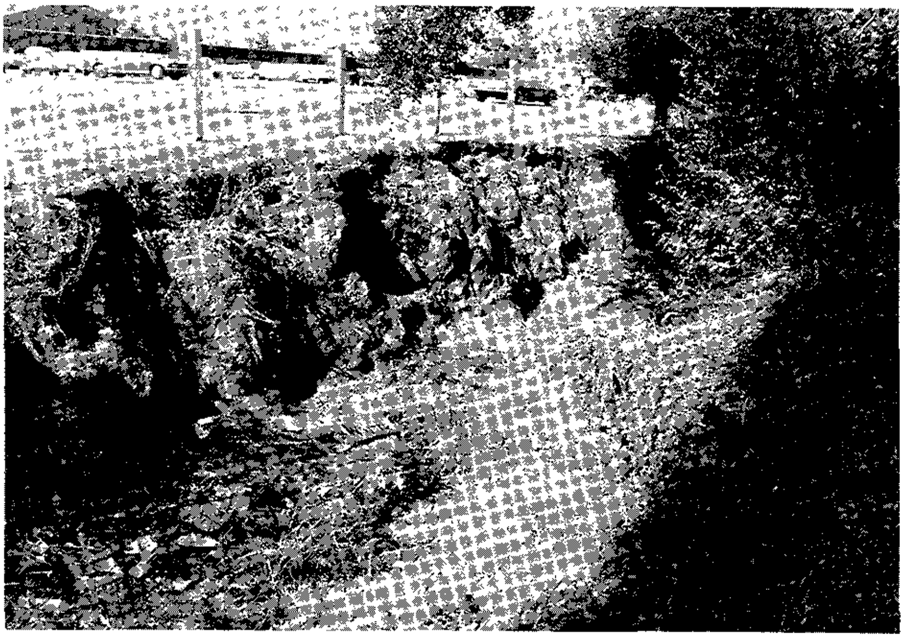


Looking Downstream from Portland Avenue

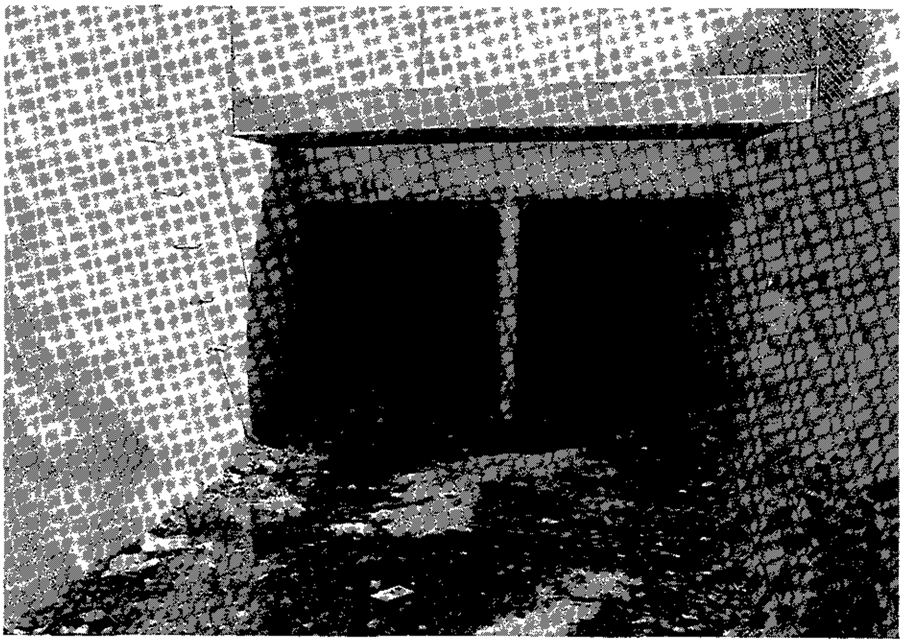


Looking Upstream from Covington Road Bridge

Fig. 2B-VISUAL CONDITIONS ALONG THE CREEK AND THE DIVERSION CHANNEL



Erosion near Blossom Valley Shopping Center



Sedimentation in Front of Altamead Drive Box Culvert

Fig. 2C-VISUAL CONDITIONS ALONG THE CREEK AND THE DIVERSION CHANNEL

Between Covington Road and St. Francis High School, the characteristic plant species are similar, although the tree canopy is more mature and dense enough to severely restrict the growth of most understory species. The result is channel slopes nearly devoid of vegetation in the denser areas. In spite of this condition very little erosion has occurred.

Where the tree canopy is broken, understory species provide their own dense canopy to the exclusion of smaller plants. Poison oak and blue elderberry dominate these areas.

Most of the reach between St. Francis High School and Cuesta Avenue is an artificial channel which was excavated and realigned when Miramonte Avenue was constructed. Nearly all the larger trees are much smaller than the mature, indigenous trees in the reaches both upstream and downstream. The species diversity is relatively low, probably due to the disturbed conditions and influence of landscaping in the school property. Many saplings are established in the section downstream of the school. These small trees include mostly young live oaks and black walnut; a few other young native plants are taking hold also, such as poison oak, blackberry, and wild rose.

The reach between Cuesta Drive and Marilyn Drive has many mature trees, though a substantial amount of vegetation is non-native, reflecting previous agricultural land use and backyard escapes from adjacent residences. The blackberries and poison oak are so dense in some areas that they are impenetrable. Other parts of this reach are nearly devoid of mature trees. A relatively well developed understory exists in many sections of this reach where sufficient light is available.

The reach between Marilyn Drive and the confluence with Hale Creek is characterized by mature vegetation composed of a mixture of native riparian species, agricultural remnants, naturalized plants, and introduced exotics and escapes from adjacent backyards. Natural succession appears to be occurring, as evidenced by the species composition of saplings which differ from the existing canopy. Many plants in this reach provide food for wildlife; these plants include black and English walnut, blue elderberry, blackberry, poison oak, wild rose, coast live oak, willows, and toyon.

The Permanente Diversion Channel is a concrete channel with limited vegetation along the channel. At a few locations, the trees from neighboring backyards canopy over the channel.

Appendix B provides the details of the plant species and the observed wildlife along the creek.

Previous Studies

Following the widespread flooding in Santa Clara County in 1955, several studies were undertaken to develop solutions to the flooding problem in the County. In 1956, the Santa Clara Valley Water Conservation District conducted a study to determine the feasibility of constructing a dam across the south fork of the Permanente Creek(2)[1/]. The study concluded that the project was uneconomical to build. In the same year, the Santa Clara County Flood Control and Water Conservation District studied two alternatives for alleviating flood hazards: 1) improve Permanente Creek and 2) construct a diversion channel to Stevens Creek(3). The second alternative was the least expensive, and in 1960 the recommended diversion channel was constructed.

In 1978, George S. Nolte and Associates, a consulting firm, conducted a flood insurance study for the Federal Insurance Administration (FIA), Department of Housing and Urban Development. The purpose of this study was to identify the areas subject to one percent flooding under existing conditions. This information is contained in two reports published by Nolte (4, 5), for the FIA.

[1/] Numbers in the parenthesis refer to references listed in the Bibliography, Appendix H.

Objectives of the Current Study

Based on a general understanding of the stream-related problems along Permanente Creek, the current study was undertaken in 1977 to achieve the following objectives:

1. Precisely define the problems related to the creek including the public's perception of those problems.
2. Identify and evaluate alternative ways of solving the defined problems.
3. Select the best combination of improvements to solve the problems in a cost-effective manner and consistent with environmental protection and public preferences.
4. Propose an implementation plan for financing and constructing the proposed project.

Public Involvement

Public involvement was incorporated into this study from the beginning. Upon development of preliminary alternative solutions to the flood and erosion problems, a brochure describing these was sent to the affected residents, public agencies and other interested groups. A questionnaire was attached to the brochure to solicit the preferences and views of the affected public, including their perception of the problems. On November 10, 1977, a public meeting was held at St. Francis High School. Additional community input was sought at this meeting. Following the meeting, another questionnaire was sent to secure additional public comments and to determine whether or not additional meetings were desired. The questionnaires and a summary of the responses are included in Appendix C.

In addition to the involvement of the general public, several meetings were held with the various public agencies impacted by the problems or alternatives being studied. These meetings were intended to acquaint the agencies with the problems identified, the alternatives being studied, and finally, the proposed project. They were also designed to secure from these agencies their suggestions for solutions and their comments on the proposed project. The agencies consulted were the various departments of the Cities of Mountain View and Los Altos, the El Camino Hospital, the Blach Junior High School and Los Altos School District, and the California Department of Fish and Game.

PROBLEM DESCRIPTION

This section of the report discusses the flood, erosion, sedimentation, and maintenance problems along the creek and the diversion channel. The next section discusses the alternative solutions studied. The proposed project includes elements to deal with each of these problems.

Flooding Problems

For descriptive purposes, the flooding problems related to Permanente Creek can be divided into two categories: the flooding and damages which have occurred in the past - the historic flooding, and the flooding and damages which can be expected to occur in the future - the potential flooding.

Historically speaking, flooding and resultant damages associated with Permanente Creek have been moderately frequent. For example, significant flooding problems were encountered during the winters of 1940, 1950, 1952, 1955, and 1958. (4,5,6 and 7). For the most part, the primary problems occurring in those years were located north of the study area covered in this report. In February, 1940, several homes and some agricultural lands in the vicinity of El Camino Real and Mountain View Avenue were damaged. In November, 1950, many stores along El Camino Real were again flooded, as well as several acres of orchard land along Miramonte Road. In January, 1952, a few homes near San Ramon Avenue and Middlefield Road were flooded.

The largest historic floods from Permanente Creek occurred in December, 1955, and April, 1958. In 1955, approximately 770 acres of land were flooded around El Camino Real, resulting in the evacuation of about 100 people. In 1958, flooding occurred in the study area along Miramonte Road and to a much greater extent near Middlefield Road.

In 1960, the Water District constructed the Permanente Diversion Channel to divert some of the Permanente Creek flows to Stevens Creek. The purpose of this facility was, in conjunction with other downstream channel enlargement works, to reduce the frequency of flooding in the area around El Camino Real and north to the Bay. These facilities, however, were not designed to prevent all flooding. Consequently, the potential still remains for significant flood damages from the less frequent, but larger flows on Permanente Creek.

The present flood control facilities in the study area (the diversion channel and the natural creek) have sufficient capacity to protect the area from the 12-year or eight percent flood event. This event has a flow rate of 1400 cfs. Larger floods such as the 25-year and 100-year floods will still cause significant damages in the study area. It is important to note, however, that these damages would be considerably larger if the diversion channel did not exist. The following paragraphs provide an indication of the magnitude of the future flood damages for the 25 and 100-year floods if no additional flood damage reduction facilities are installed.

Figure 3 presents a map showing the areas which would be inundated during a 25-year flood based on present conditions. This event has a flow rate of 1700 cfs. The total area flooded is approximately 60 acres, consisting of residential, public, and commercial lands. Depth of flow would range up to two feet. Two major public facilities would be affected by the flooding: Blach Junior High School and the El Camino Hospital. Approximately 75 homes are also located in this floodplain. Damages from this flood would exceed $30,300,000, including $30,000,000 in damages to the hospital alone. The hospital damages would be due primarily to the filling of the service area

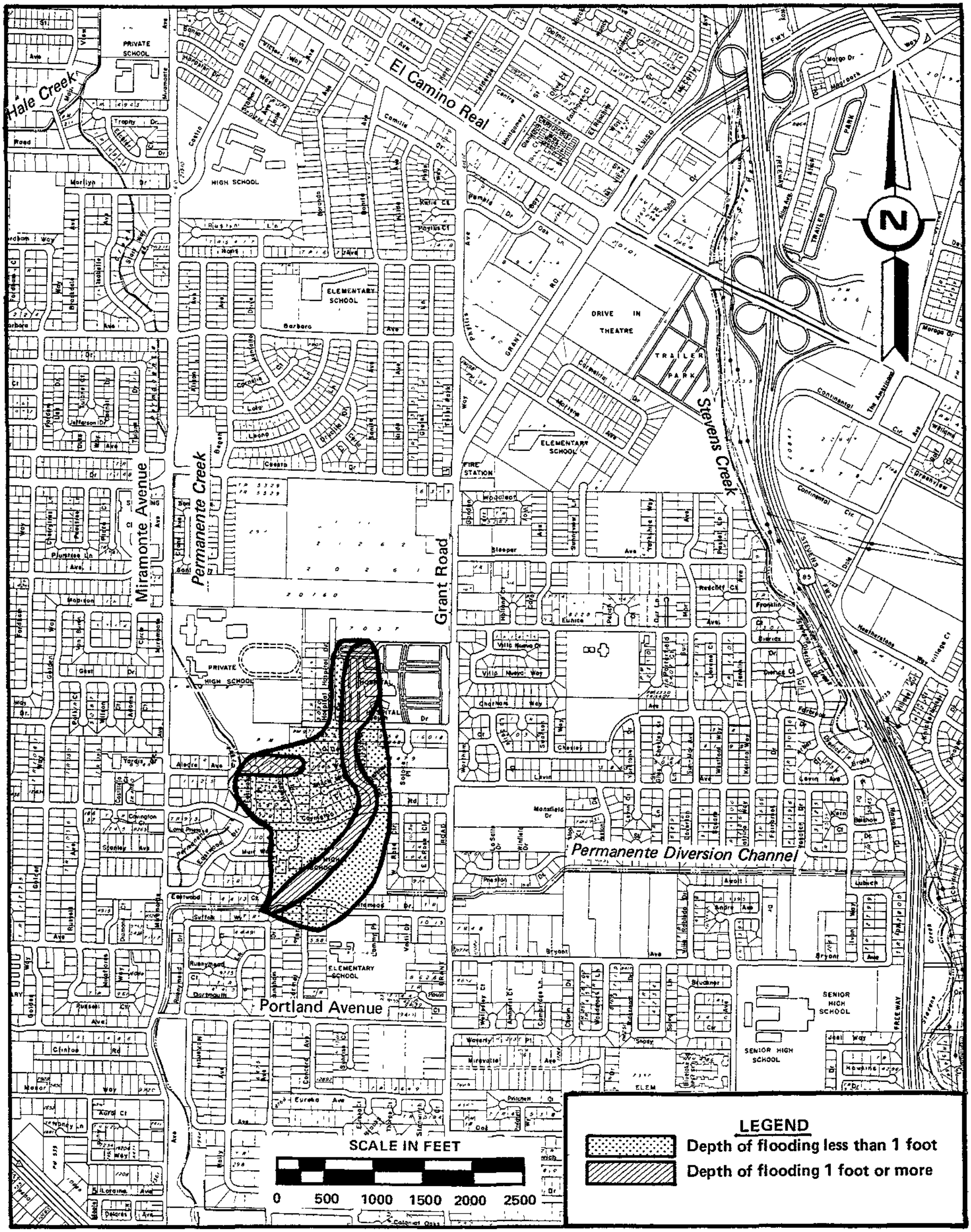


FIG. 3 PERMANENTE CREEK-FOUR PERCENT (25-YEAR) FLOOD MAP UNDER EXISTING CONDITIONS

basement with flood waters and the subsequent failure of the hospital's main power and communications systems, including the back-up systems. The hospital staff has estimated that such an occurrence would result in the closing of the hospital for approximately six months to repair the damage.

Figure 4 presents a map showing the areas which would be inundated during a 100-year flood in the study area. This event would have a flow rate of 2,670 cfs. The map divides the flood-prone area into two categories to reflect whether or not the Federal Flood Insurance regulations apply. Only those areas where the depth of flooding would be greater than one foot must comply with these requirements. The National Flood Insurance Program is described in Appendix D. Flood depths for this event would range up to three feet.

The total area flooded during the 100-year flood is approximately 260 acres. Approximately 60 acres are subject to the flood insurance regulations. The 100-year floodplain includes 465 homes, two schools and the El Camino Hospital. Total flood damages during this event would be $44,000,000, including $42,000,000 (1) in damages to the hospital alone.* Approximately 79 homes are presently located in the area subject to flood insurance requirements.

A portion of the study area is also subject to flooding from floodwaters escaping from Hale Creek, west of the study area. This flooding is confined primarily to the area north of Rose Avenue near the junction of Hale and Permanente Creeks. This problem will be solved as part of a separate project and is not addressed further in this report.

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* Damage cost estimate by Hospital District

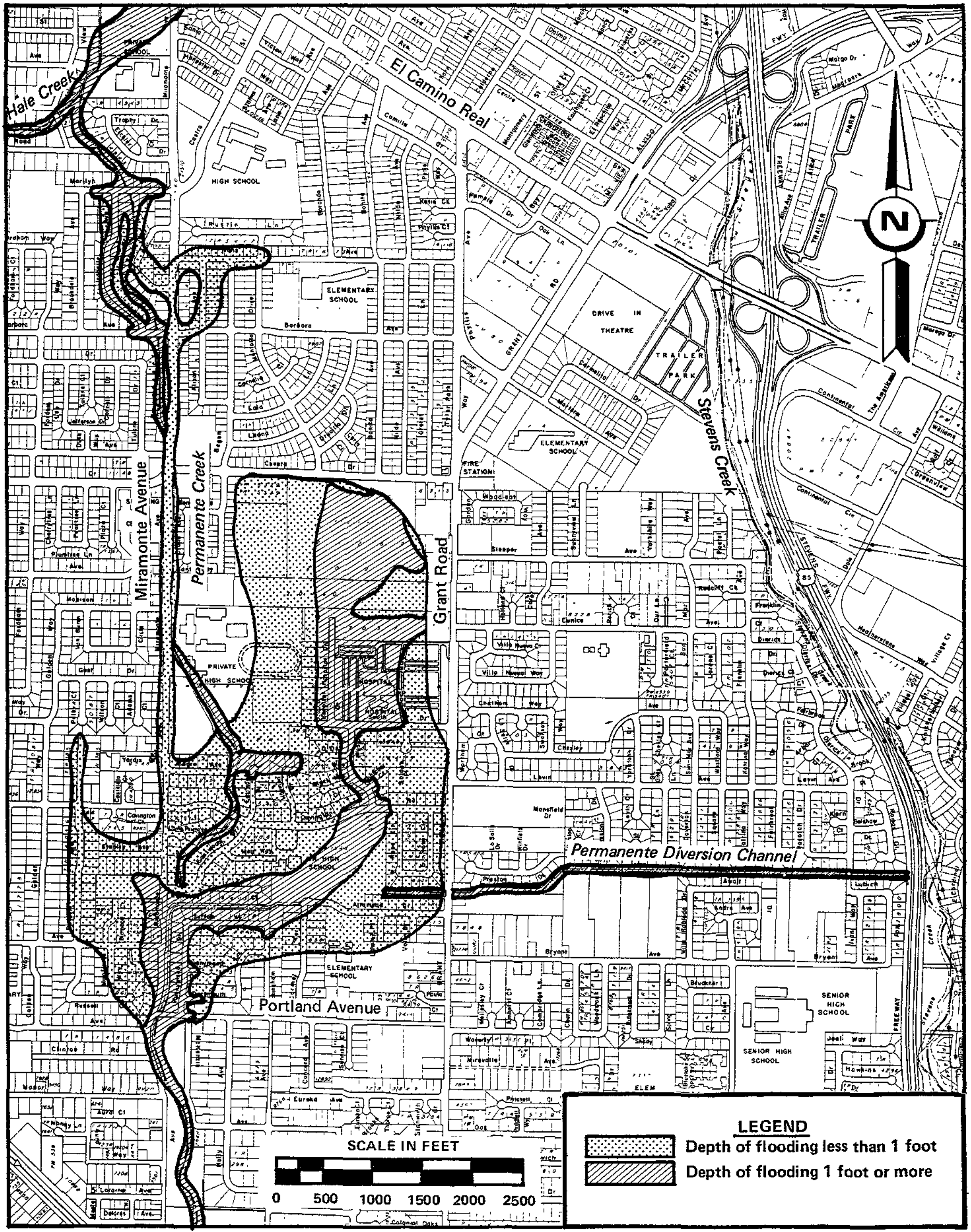


FIG. 4 PERMANENTE CREEK-ONE PERCENT FLOOD MAP UNDER EXISTING CONDITIONS

Erosion Problems

Although erosion problems are generally minor in the study area, there are a few locations in the unlined channel where erosion is occurring. Specifically, both the banks about 500 feet south of the intersection of Cuesta Drive and Miramonte Avenue and the right bank just south of Marilyn Avenue are experiencing erosion (See Figure 2c). Erosion is also taking place in the creek just north of Portland Avenue. Property damage is likely at these locations if the erosion is not controlled.

Sedimentation Problems

The natural slope of the creek bed south of Portland Avenue, is relatively steep. Consequently, in the reaches upstream of Portland Avenue, water would flow with relatively high velocities. Such high velocities cause erosion in the upper reaches and carry considerable quantities of sediment, which normally is deposited near obstructions such as bridges and culverts and in the downstream reaches of the creek where the creek bed slope is relatively flat. This results in reduced flow area and capacity and increases the potential of more frequent and extensive flooding.

Since the diversion channel carries most of the flows, the major share of sediment load is also deposited along this channel. Most of this deposition occurs within and in front of the box culvert at Altamead Drive (See Figure 2c). This sediment has reduced the effective height of the box from seven feet to about four feet. During the larger flows, some of these deposits will be washed away, but there is no assurance that the culvert will operate as designed.

Maintenance Problems

Problems which fit into this category are related primarily to difficulties associated with providing proper maintenance along the creek and diversion channel. These problems generally involve inadequate physical access to efficiently do the maintenance work, or the lack of the legal rights to do the work (rights of way). Some of these problems may be overcome by physical modifications to the system.

With regard to physical access for maintenance activities, there are several areas of the creek and diversion which experience frequent sediment deposition but which have no access to the bottom of the creek to permit efficient sediment removal. These areas are between Portland Avenue and Grant Road. Present sediment removal methods are expensive and time-consuming.

Another access problem exists in the natural channel downstream of the diversion. In these areas, the creek is so richly endowed with riparian habitat and so narrow that vehicular access is impossible. Maintenance work here must be done manually, which is also quite costly and time-consuming.

Generally speaking, the Water District has sufficient right of way along the creek and diversion channel in the study area to perform the required creek maintenance. There are, however, two areas along the creek downstream of the diversion channel where the Water District has no land rights. One of these areas is a 300 foot reach north of Marilyn Drive. The second reach is between Eastwood Place and Allegre Avenue. Additional right of way will be acquired in those areas to permit creek maintenance work.

Public Concept of Problems

As described in the section on public involvement, a questionnaire was sent to some of the residents of the study area to determine their concept of the problems associated with the creek and diversion channel. A summary of the responses is included in Appendix C. In general, the responses indicated that residents considered insufficient maintenance of the creek as the major problem. The other problems mentioned by the residents were a) erosion at certain locations and b) inadequate flow in the creek below the diversion during low flow periods. Each of these problems were addressed in this study and solutions for them are included in the proposed project.

ALTERNATIVE SOLUTIONS

This section of the report describes the general alternatives studied to solve the problems described in the previous section and the major impacts of these solutions. It also presents a comparative evaluation of these alternatives and reasons for selection of the recommended project. The design objectives used in the development of these alternatives are also presented.

Design Objectives

Before describing the specific alternatives analyzed during this study, it is important to summarize what the objectives of these alternatives are. In the section which describes the proposed project, the specific criteria used to design the proposed project will be described. The design objectives for the various alternatives are as follows:

1. To prevent flooding in the study area during the one percent flow on Permanente Creek. (This is a basic criterion used to permit selection of the best alternative. Once the best alternative is selected, a further analysis is done to establish the most cost-effective level of protection to provide).
2. To control erosion and sedimentation at critical locations.
3. To correct the defined maintenance problems.
4. To minimize or mitigate the environmental impacts of the project.

and 5. To provide mitigation works where an alternative will have an adverse impact on another creek (for example, where the flows in Stevens Creek are increased significantly by the "diversion" alternatives).

The alternatives presented in the following section were formulated to achieve these objectives.

The Alternatives

There are many possible solutions to the flood problems within the study area. Examples of the general types of solutions available are nonstructural measures such as flood insurance, floodplain zoning, and flood proofing of individual structures. Structural solutions could include new channels or diversions, enlargement of existing channels, culverts, and bridges, and construction of reservoirs. Four specific alternatives were selected from this list of potential solutions. Solutions requiring any major structural improvements along the natural creek downstream of the diversion channel were discarded because of the significant adverse environmental impacts they would create.

The alternative solutions considered are described on the following pages by 1) discussing the objective of the solution, 2) describing the principal features, and 3) presenting the estimated cost. The alternatives discussed relate specifically to the one percent flood problem. The special features needed to solve the erosion, sedimentation and maintenance problems are described in the section dealing with the proposed project because those features are similar for all alternatives.

The four alternative solutions were evaluated using comparative costs and the severity of the environmental impact. Costs included the right of way construction, and engineering and administration costs. The environmental evaluation included biological and social impacts of the proposed solutions.

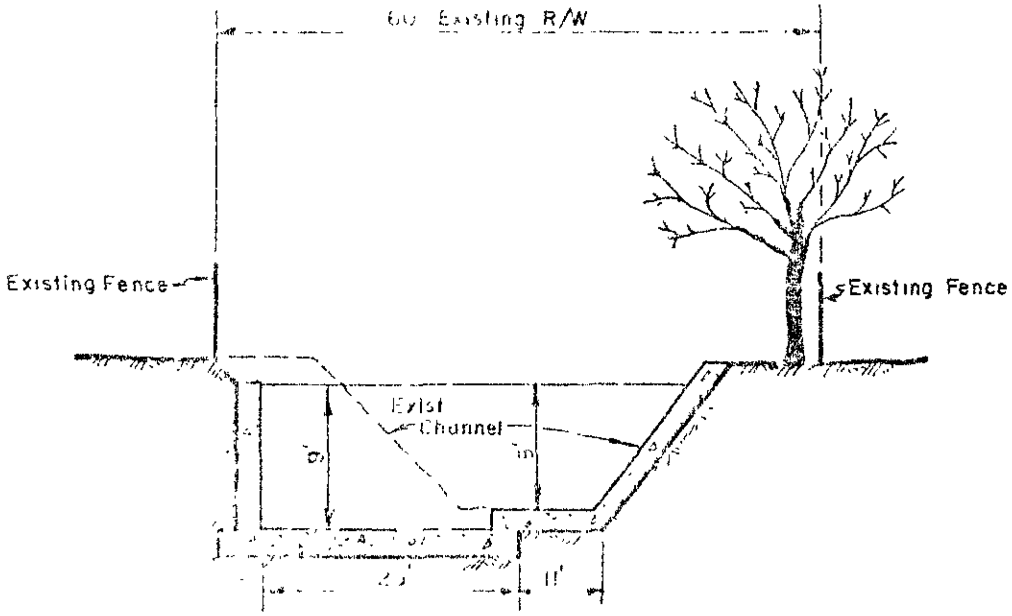
Alternative 1 - Emergency Actions

The objective of this alternative is to reduce the flood damages by emergency actions prior to, during, and after a flood. The principal features of the alternative would include a more intensive maintenance program, a short-term flood warning system, emergency evacuation, post-flood cleanup and assistance activities, and the use of flood insurance (Ref. Appendix D) to recover flood damage losses to structures within the floodplain. No new construction would be included.

The estimated cost of this alternative is $447,000. This cost reflects the cost of insurance to the resident property owners, Blach Junior High School, and El Camino Hospital,and the cost of a flood warning system. The costs of emergency evacuation and post-flood assistance cannot be estimated because they will vary with the magnitude and duration of the flood.

Alternative 2 - Enlarge Permanente Diversion Channel

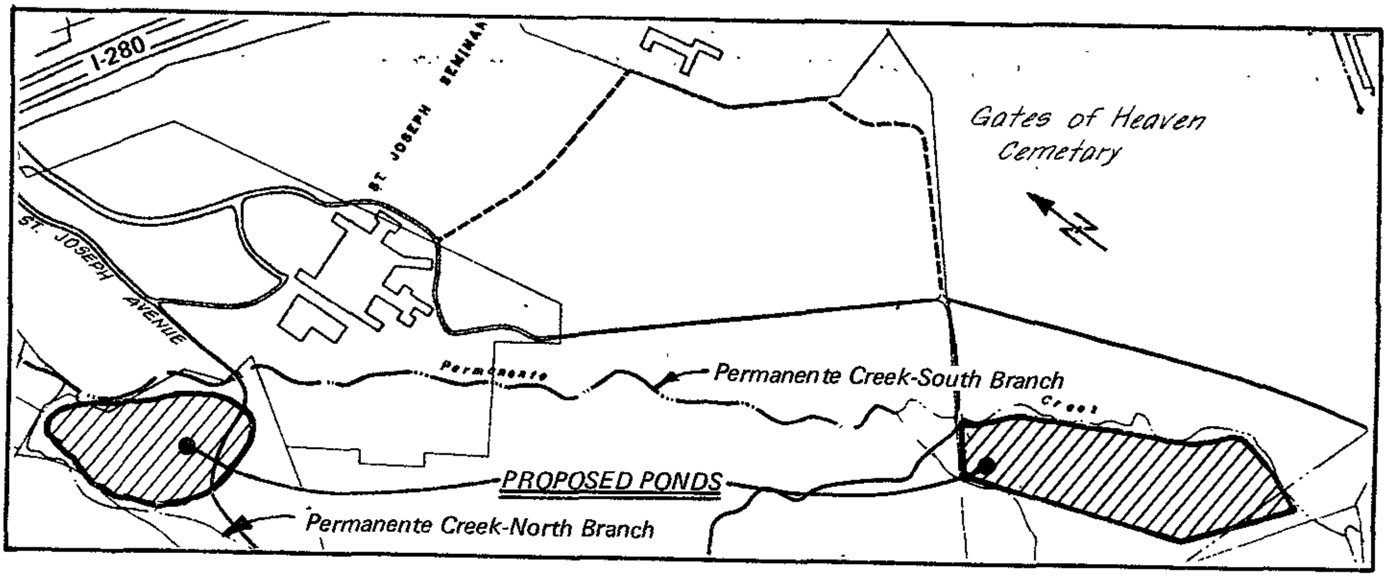
The objective of this alternative is to provide all the needed additional flow capacity by enlarging the existing Permanente Diversion Channel. The principal features of this alternative would be the partial rebuilding of the existing concrete-lined diversion channel. An additional box culvert would be added at Altamead Drive and all the street crossings and the culvert under Highway 85 on Permanente Diversion Channel would be enlarged. Upstream of the diversion, the creek would be enlarged and concrete lined up to Portland Avenue and the Portland Avenue bridge would be replaced. A typical cross section of the enlarged diversion channel is shown below.



The estimated cost of this alternative is $6,351,000. No additional right of way would be needed.

Alternative 3 - Reservoirs and Channel Modifications

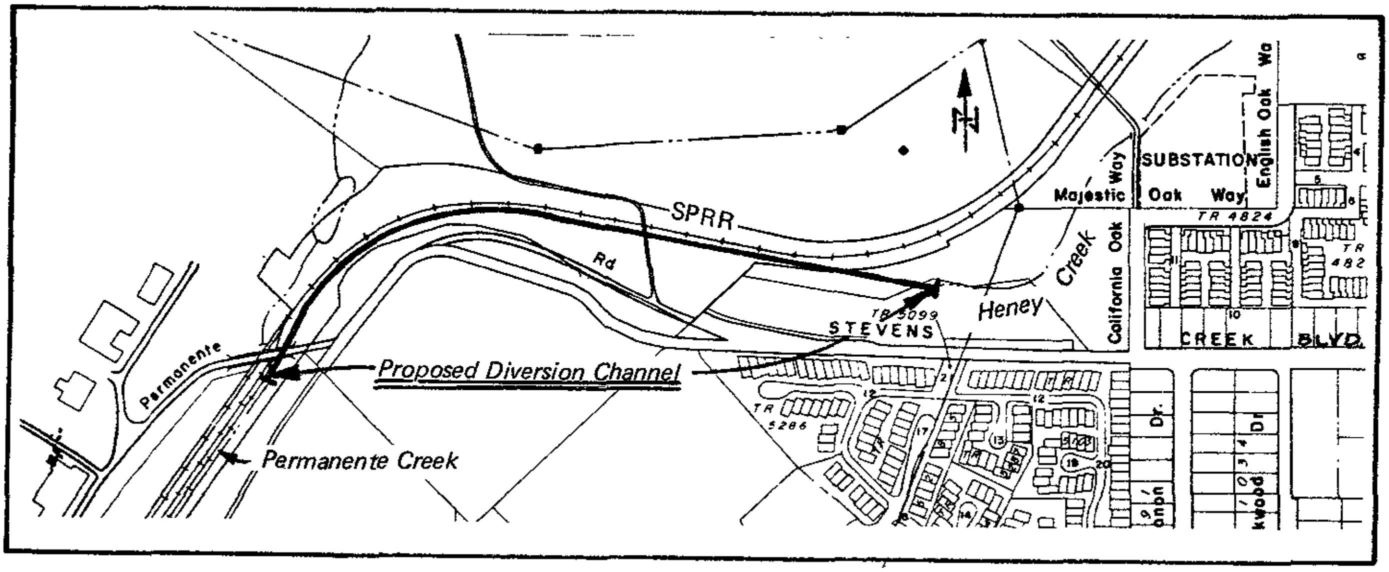
The objective of this alternative is to reduce the peak flood flows in urban areas by temporary storage of runoff in flood detention reservoirs in the upper watershed. The principal features of this alternative would consist of constructing two small reservoirs upstream of Highway 280, one on the North Fork and one on the South Fork of the creek. In addition, several modifications along the creek north of Portland Avenue and along the diversion channel would be required. The following map shows the general location of the reservoir sites.



This alternative is estimated to cost $3,729,000.

Alternative 4 - New Diversion Channel

The objective of this alternative is to reduce the peak flood flows along Permanente Creek's urban area by diverting a portion of the runoff to the Stevens Creek watershed. The principal features would consist of constructing a new concrete-lined diversion channel along Heney Creek near Permanente Road to Stevens Creek near Highway 280. The following map presents the general alignment of this diversion.



The estimated cost of this alternative is $4,580,000.

Selection of the Preferred Alternative

The comparative costs and the environmental impacts for each of the above alternatives are presented in Table 2.

From the table, it is apparent that Alternative 1, proposing emergency actions and flood insurance, is the least expensive of all. However, it should noted that the cost does not reflect all the tangible and intangible costs to be the community. The damage to the emergency equipment of El Camino Hospital could mean potential loss of lives. Therefore, this alternative, though cheaper in first cost, was unacceptable.

Alternatives 2 and 4, which propose additional flow diversion to Stevens Creek, would increase flooding potentials in the Stevens Creek watershed and would require additional expensive flood control measures on Stevens Creek.

Alternative 3 is the lowest cost structural alternative. Furthermore, implementation of this alternative will not significantly affect the creek environment. Finally, the results of the questionnaire survey and the comments received at the 1977 public meeting generally supported Alternative 3. About 87 percent of the respondents favored Alternative 3 over the other three alternatives. Based on these responses from the community and the engineering analysis, Alternative 3 was selected as the preferred alternative.

Evaluation to Select the Proposed Project

Following the basic study to determine which alternative will best achieve the general project objectives, a more detailed analysis is performed to identify what project will most effectively use the public's funds. This analysis involves a cost-benefit study of the separate elements of the preferred alternative to ensure that each added feature is justifiable. Such a study leads to conclusions regarding which elements, if any, should be eliminated because their costs are substantially larger than the benefits they will produce.

TABLE 2 - COMPARATIVE ANALYSIS OF THE ALTERNATIVES

	Alternative	$ Cost	Environmental Effects	
			Positive Aspects	Negative Aspects
1.	No Project - Emergency Actions Only	$ 447,000	a. Creek environment will be unaffected. b. Construction-related impacts will be avoided.	a. Flood problem will still exist; El Camino Hospital Blach Jr. High and other residences will be flooded. b. Residents and businesses within flood hazard areas will need to obtain flood insurance.
2.	Enlarged Diversion Channel	$6,351,000	a. Flooding due to 1% flood would be eliminated. b. Creek environment will be minimally affected. c. Construction will be confined to previously impacted areas and will not have significant impact.	a. The most expensive alternative. b. Would add to the flood potential on Stevens Creek. c. Significant construction-related impacts in residential areas.
3.	Modification of Permanente Creek and Diversion Construction of Flood Detention Ponds	$3,729,000	a. 1% flooding would be eliminated. b. The lowest cost structural alternative. c. Creek environment in the lower reaches will not be impacted significantly.	a. Will need to acquire large land areas for ponds. b. The creek environment will be significantly affected in the neighborhood of ponds; mitigation measures will be required May also impact archeological site. c. Operational aspects of the ponds are complex. A hydraulic modeling of the system would be required.
4.	New Diversion Channel	$4,580,000	a. Would provide 1% flood protection. b. Construction impacts on the creek will be limited to modifications at some bridges and culverts.	a. Would increase flood potential on Stevens Creek. b. Environmental impacts on Heney Creek would be significant. c. 14 acres of additional land aquisition will be needed for diversion channel. d. Construction costs relatively high.

Alternative 3, the preferred alternative, can be readily separated into two independent elements, the upstream reservoir system and the downstream channel modifications. In effect, the channel modification measures will raise the level of flood protection from the 12-year flood to the 25-year flood. The addition of the upstream reservoirs raises the level of protection from the 25-year flood to the 100-year flood. Because the cost of the reservoirs were quite high relative to the total project costs, this element was evaluated for cost-effectiveness.

Because of the critical nature of the El Camino Hospital, this facility should be protected from at least the 100-year flood. Therefore, the channel modification element of Alternative 3 was expanded to include flood proofing measures at the hospital which would prevent damages during this event. The cost-effectiveness evaluation was based on this condition.

The results of the cost-effectiveness study indicated that the addition of the upstream reservoirs at this time was not justifiable. The channel modification and flood proofing element would reduce average annual flood damages by approximately $1,714,000 at an equivalent annual cost of about $70,000. The addition of the reservoirs would further reduce the average annual flood damages by $15,000 at an equivalent additional annual cost of $245,000. From a cost-effectiveness standpoint, the reservoirs add little benefit for the cost incurred. The actual benefits of the proposed project are described in the next section.

Based on the findings of this analysis, the proposed project does not include the upstream reservoirs. This element may be added at a future date when the benefits are available to justify it and when other higher priority projects have been completed. At that time, a separate Engineer's Report will be prepared describing the details of the project and its impacts.

THE PROPOSED PROJECT

This section of the report contains details of the proposed project, including specific design criteria, and the maintenance program for the project. It also presents the proposed project's benefits and the costs, financing, and construction schedule for the project.

Design Criteria

The various elements of the proposed project were designed in accordance with accepted engineering practices. In some cases, criteria normally applied on Water District projects were modified where significant economic savings could be realized without jeopardizing the objectives of the project. Where these changes were made, they are noted in the following paragraphs.

The principal criteria used in the design of the proposed project involved the following parameters: 1) design flow rates, 2) allowable flow velocities, 3) freeboard, 4) channel roughness coefficients, and 5) revegetation. The criteria used in each of these categories are as follows:

1. Design Flow Rates - The following table summarizes the flow rates for the 100-year flow and the 25-year flow after the proposed project is built. These flow rates correspond to various locations along Permanente Creek and the diversion channel as indicated in the table.

Location	100-Year Flow	Design Flow Criteria (cfs) 25-Year Flow*
SR 280	2570	1600
Portland Avenue	2670	1700
Marilyn Avenue	600***	350
Altamead Drive	1700***	1450**

*Criteria for proposed project
**Maximum capacity at diversion point
***Includes out-of-channel flow at that point.

2. Allowable Flow Velocities - The following table summarizes the maximum allowable velocities for design flow rates for the corresponding channel type:

    a. Concrete lining - 20 feet per second

    b. Sacked concrete slope protection (spot erosion control) - Controlled by earth-lined sections

    c. Existing earth channel - 8 feet per second unless actively eroding

3. Freeboard - In all areas where channel modifications were proposed, a minimum freeboard of two feet was provided above the design flow water surface. Where existing culverts were being proposed for modification, a minimum of two feet of freeboard was provided in the upstream channel for design flow conditions. In those cases where the existing facility would contain the design flow, no additional work was proposed to provide the minimum freeboard specified above. In some reaches of the creek, therefore, no freeboard exists. The addition of structural improvements to provide freeboard in these cases would have added significantly to the project cost.

4. Channel Roughness Coefficients - Two principal channel types are encountered in the proposed project: 1) earth-lined, vegetated channels and 2) concrete-lined channels. For the earth-lined sections, a Manning's roughness coefficient of 0.035 was used. For the concrete-lined sections, the coefficient used was 0.015.

5. Revegetation - The general criteria used in the proposed project was that revegetation would be provided as a mitigation measure where the proposed improvements would cause significant damage to an existing riparian community. Because no such damage will result from

the proposed project, no revegetation program is included in the channel sections. However, at the El Camino Hospital, there will be a need to replace landscaping removed for construction of the flood proofing facilities.

Details of the Proposed Project

a. Modifications from Portland Avenue to the Permanente Diversion Channel: The existing section of earth channel from the Portland Avenue bridge to the existing drop structure, 750 feet downstream, will be concrete lined to increase its flow capacity, to provide freeboard of two feet or more, and to eliminate erosion problems. A beam structure just south of the Portland Avenue bridge that acts as an obstruction to flow will be removed. A telemetric water level monitoring system will be installed at the existing stream gaging station near Berry Avenue to permit an instantaneous check of the water levels in the creek during emergency periods. A maintenance access ramp will be installed just north of the gaging station to permit more efficient maintenance of the creek bottom. The cost for the proposed work in this reach is estimated at $304,000. Approximately 0.32 acres of additional right of way will be required from the City of Los Altos immediately north of Portland Avenue.

b. Modifications Along the Diversion Channel to the Stevens Creek Outfall: The proposed changes near the diversion structure are: 1) seal the orifice in the bottom of the diversion channel and 2) provide a 4-foot-wide opening in an existing partition wall to permit low flows into the creek. A trashrack will be installed at the opening to prevent debris from entering the diversion pipe. These proposed modifications would control both water and sediment flow into the diversion pipe. While carrying the design flow, no freeboard would exist in some locations in the reach between the diversion point and the upstream stream gaging station.

The proposed work in the vicinity of the Altamead Drive box culvert would consist of an additional 6.0-foot-diameter, 800-foot-long pipe with appropriate modifications of the upstream and downstream channel to accommodate the pipe. The modifications will be such that the low flows and accompanying sediment load would be directed to the new pipe. This would reduce the sedimentation problem in the existing box culvert. The existing headwall will be raised to two feet above the design water level. The concrete lining of the upstream channel will be extended vertically approximately 3.5 feet for a distance of about 200 feet to provide the design capacity and freeboard. An additional 8 to 20 foot easement on the school property would be acquired for widening the maintenance road. The widening will require earth filling and relocation of the existing chain link fence. Along the existing road on the school property, a low retaining wall will be constructed where the earth fill slopes would otherwise fall outside of the proposed right of way.

A new access ramp into the diversion channel will be constructed west of Grant Road to permit more efficient silt removal between the Altamead Drive box culvert and Grant Road.

The proposed improvements at the entrance of the box culvert under Highway 85 would consist of cutting a 4-foot by 3.5-foot notch at the bottom of the transition channel. This will lower the upstream water surface elevations to within the channel during the design flow.

The construction cost of the proposed work in this reach is $403,500.

c. Modifications to the Creek From Diversion Channel to Hale Creek: As mentioned previously, the major proposed improvement in this reach is enlargement of the Marilyn Drive box culvert. The existing creek in the reach between Barbara Avenue and the confluence with Hale Creek has a flow capacity of about 350 cfs, but the existing Marilyn Drive culvert can pass only 250 cfs. Therefore, the existing 8-foot by 5-foot box culvert will be replaced with a larger 14-foot by 6-foot box culvert.

There are some active erosion areas in this reach. These are: 1) bank erosion at four locations in the reach opposite the Blossom Valley Shopping Center and 2) from Station 84+70 to Station 86+20, south of Marilyn Drive. Sacked concrete slope protection is proposed at these locations.

The District has a continuous right of way in most of the areas in this reach from Eastwood Place to the confluence with Hale Creek. However, from Station 89+50 to Station 92+00, the creek is not contained within the District right of way. An additional right of way of 0.46 acres as shown in Drawing Sheet 6, will be acquired for creek maintenance purposes. Also, approximately 0.25 acres of additional right of way will be acquired near Eastwood Place, Covington Road and Alegre Avenue for maintenance purposes.

The estimated cost of the proposed work in this reach is $137,500.

d. Flood Proofing El Camino Hospital: Low berms and floodwalls will be constructed around the hospital at selected locations to prevent flooding of the critical hospital facilities. A sliding, watertight gate will be provided at the entrance to the ramp and portable gates will be provided at other access points to prevent the floodwaters from entering the basement area. A floodwall will also be constructed to protect a control panel and emergency service area near Grant Road. Measures will also be provided to prevent backflow from the storm sewers into the flood proofed areas. The flood protection measures, including landscaping for the new berms, would cost about $119,000. The details of the proposed work are presented in Sheet 10 of the project drawings in this report. Permanent easements will be acquired wherever flood proofing facilities are involved.

Project Benefits

The proposed project, while not preventing flooding during the 100-year flood, does produce significant benefits. Generally, the benefits can be summarized as follows:

1. The frequency of flooding will be cut in half (25-year event instead of the 12-year event) in the general floodplain.
2. The magnitude of the damages during a 100-year flood will be reduced by about 97 percent.
3. Erosion will be stopped.
4. Maintenance access will be improved permitting more efficient and frequent creek maintenance.

The specific project benefits with regard to flood damage reduction are best described with respect to the 25-year flood for which damages are eliminated and for the 100-year flood, for which damages are significantly reduced. For the 25-year flood, 75 homes, the Blach Junior High School, and the El Camino Hospital, would be freed from flooding; flood damages prevented would exceed $30,000,000. For the 100-year flood, approximately 109 homes and the El Camino Hospital would be removed from the floodplain and 20 homes would be removed from the Federal Flood Insurance requirements. Approximately 59 homes would still be subject to these requirements (annual cost of about $8,300) and 297 other homes and Blach Junior High School would still be subject to flooding, although to a lesser extent than would occur today. The 100-year flood damages would be reduced from approximately 44,000,000 to approximately $1,200,000. Figure 5 shows the flood prone areas which will remain after completion of the proposed project.

Project Costs, Financing, and Scheduling

It is estimated that the total cost of the proposed project is $964,000 at 1979 prices. This cost includes construction costs, engineering and administration costs, and right of way costs. A detailed cost breakdown for the proposed project, including quantities and unit prices is presented in Appendix E of this report.

The initial costs of the proposed project will be borne by the Water District. However, the costs to implement the flood proofing around the hospital will be repaid by the Hospital District within a period to be agreed upon later. At the present time, the Santa Clara Valley Water District has funds available for constructing the proposed project. No new taxes will be imposed.

The proposed project will be budgeted for construction in FY 1979-80. The proposed work at the Blach Junior High School will be scheduled to occur during the summer period to minimize noise and safety problems for the school. The construction contractor will be required to provide adequate safety measures to eliminate construction hazards at the school site.

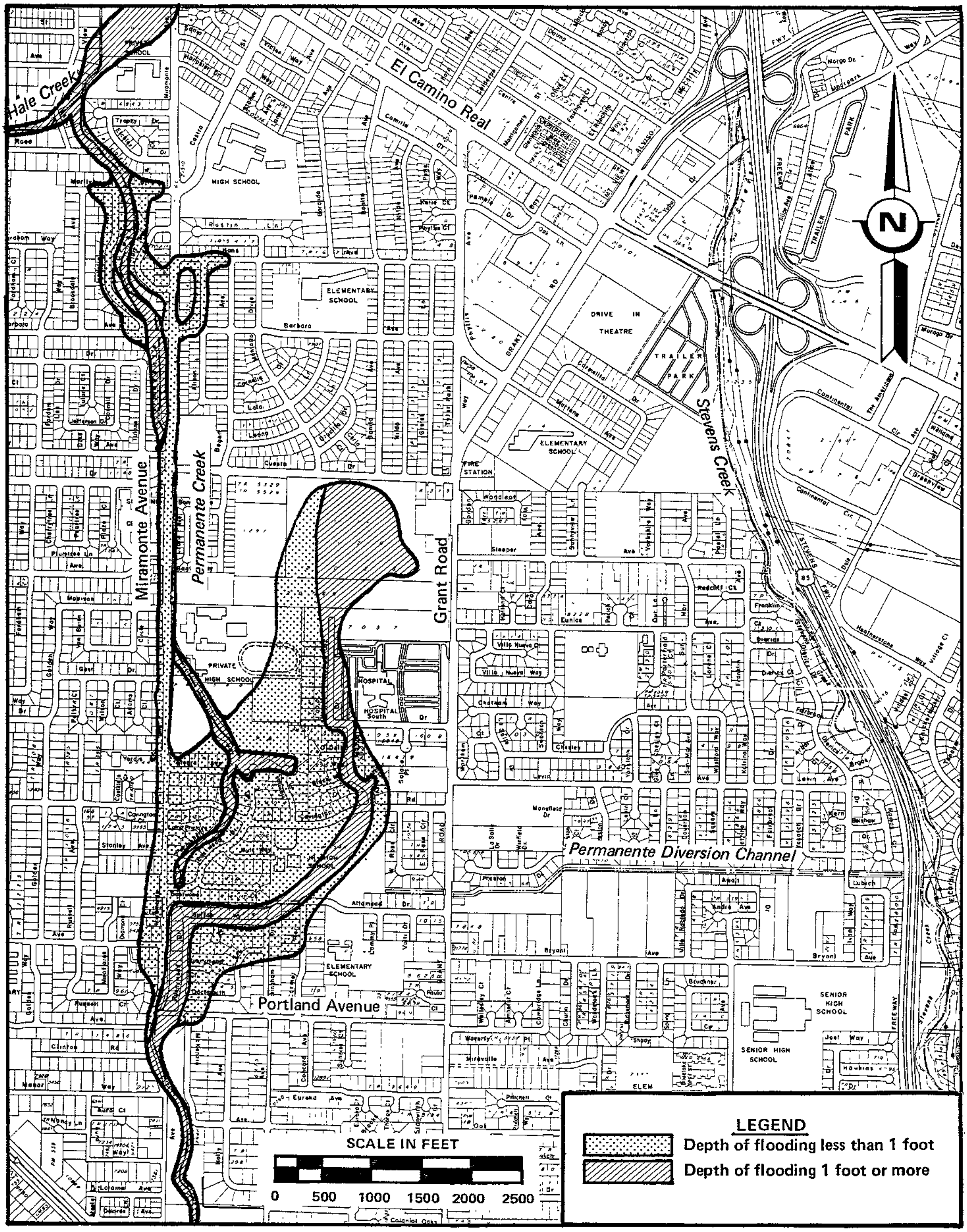


FIG. 5 PERMANENTE CREEK-ONE PERCENT FLOOD MAP AFTER PROPOSED MODIFICATIONS

Future Maintenance and Operation Activities

Following project construction, creek maintenance within the study area would consist primarily of the following activities: 1) annual inspection of the reach of the stream between Covington Road and Hale Creek for removal of flow obstructions such as fallen trees or obstructive brush growth in the creek bed, 2) annual inspection near the Altamead Drive box culvert to determine if sediment deposits have increased since the previous inspection, and removal of the deposits as needed to maintain the design capacity, and 3) periodic removal of silt, obstructions, and vegetative growth in the concrete-lined portions of the channels. Because the concrete-lined diversion channel will have little freeboard in some locations, it is essential that this channel be kept clean. This requires an enhanced creek maintenance program within the study area. Such a program would cost about $5,000 more than is now spent annually.

As mentioned previously, the District will build the flood protection structures around the El Camino Hospital. These structures would be maintained and operated by the hospital staff. The flood emergency operations would consist primarily of closing the sliding and portable gates to prevent floodwaters from entering the hospital basement. The gates would be closed when the water level at the stream gage station north of Portland Avenue reaches a critical level. To monitor the water level at the station, the District will install a telemetry system at a cost of about $1,000. The District will be responsible for notifying the hospital when a potential for flooding exists. Operational procedures for this notification will be developed by the District and incorporated into its Emergency Operations Manual. The hospital will be responsible for developing procedures for operating the flood proofing facilities during the emergency and for regular maintenance of and training in the operation of these facilities.

CONCLUSIONS AND RECOMMENDATIONS

As a result of this planning study, it is concluded that:

1. The combined flow capacity of the existing Permanente Diversion Channel and the Permanente Creek is inadequate to carry the one percent flow.
2. A one percent flood would cause considerable damage to residential and commercial areas and to El Camino Hospital.
3. Erosion problems exist, but they are not extensive.
4. The sedimentation problem near Altamead Drive box culvert is significant.
5. Maintenance problems exist, primarily due to inadequate creek access.
6. Any major improvement of the creek between Covington Road and Hale Creek would have significant adverse environmental impacts and would increase flooding in the reaches north of Hale Creek.
7. Of the various alternatives evaluated in this study, Alternative 3 best satisfied the objectives of the study and the desires of the community. This alternative consists of two major components: i) creek and diversion channel modifications north of Portland Avenue and ii) two flood detention ponds south of Highway 280. Because of low benefits for the second component, the proposed project will implement the first component only. Implementation of the second component - the flood detention ponds - will not occur until its benefits justify its construction and other higher priority projects are completed. A separate Engineer's Report will be prepared for the second component when it is justified.
8. The proposed project will increase the level of flood protection for the general area from the present eight percent (12-year) level

of protection to a four percent (25-year) level of protection and will provide the one percent level of flood protection for the El Camino Hospital.

9. The proposed project will not have any significant adverse environmental impacts; consequently, a Negative Declaration is appropriate and included as Appendix A.

10. Based on 1979 prices, the proposed project is estimated to cost $964,000.

11. The District has advalorem tax funds available for constructing the project.

Based on these findings, it is recommended that:

1. The project be approved as proposed.
2. Construction of the project be started as soon as possible after approval of the project.

Engineering Approval:

George Korbay

George Korbay, RCE No. 16462
Design and Construction Manager

APPENDIX A

INITIAL STUDY AND NEGATIVE DECLARATION

Project: Proposed Flood Control Measures on Permanente Creek, Project No. 1024.

Location: The reach of Permanente Creek between Portland Avenue and its confluence with Hale Creek, including the Permanente Diversion Channel.

Purpose: The proposed project is designed to provide 25-year flood protection within the floodplain of this reach of Permanente Creek.

Description of Project: Refer to Planning Study report.

Finding: Based on an Initial Study of the project pursuant to Section 15080 of the State EIR Guidelines and Section 37 of the District EIR Guidelines, staff has determined that the proposed project will not have a substantial adverse impact on the environment.

Basis of Finding: The major impacts of the project are construction-related and are, therefore, temporary. These impacts include high noise, dust and exhaust emissions levels, short-term increased soil erosion from disturbed areas and short-term aesthetic impacts.

The project's structural modifications will not disturb the biological or aesthetic values of the natural areas of the creek or result in adverse social impacts.

ENVIRONMENTAL IMPACT ASSESSMENT CHECKLIST

Explanations of all "Yes" and "Maybe" answers are required on attached sheets. If impact occurs during construction or is temporary, indicate with a "C" or "T" under Yes or Maybe.

	Yes	Maybe	No
1. Geology and Soils. Will the project result in:			
a. An increased hazard to the public resulting from geologic features of the site (landslide-prone areas, faults, slumping, etc.)?			X
b. Serious disruptions, displacements, compaction, or impervious covering of the soil?	X		
c. Introduction of toxic materials in the soil or reduction of soil fertility?			X
d. Significant change in topography or ground surface relief features?			X
e. The destruction, covering or modification of any unique geologic or physical features?			X
f. Any substantial increase in wind or water erosion of soils, either on or off the site?		T	
g. Changes in siltation, sediment transport, deposition or erosion which may modify a river, stream, or other body of water?			X
2. Air. Will the project result in:			
a. Generation of air emissions (such as dust) that will seriously deteriorate air quality standards (either locally or regionally)?		C	
b. The creation of objectionable odors?			X
c. Major alteration of air movement, moisture or temperature, or any change in climate, either locally or regionally?			X

	Yes	Maybe	No
3. Water. Will the project result in:			
a. Changes in currents, or the course or direction of water movements?			X
b. Changes in infiltration rates, sedimentation, drainage patterns, or the rate and amount of surface water runoff?			X
c. Alterations in the course or flow of floodwaters?	X		
d. An increase in downstream flood potential that might cause property damage?			X
e. Change in the amount of surface water in any body of water?			X
f. Contamination or any detrimental effect on existing water quality or quantities of either surface or sub-surface supplies?			X
g. Change in the quantity of groundwaters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?			X
h. Reduction in the amount of water otherwise available for public water supplies?			X
4. Noise. Will the project increase existing noise levels during construction or operations to the extent that existing or future residents would be annoyed?	C		
5. Plant Life. Will the project result in:			
a. Change in the diversity of species, or numbers of any species of plants (including trees, shrubs, grasses, microflora, and aquatic plants)?			X
b. Reduction of the numbers of any unique, rare or endangered species of plants?			X
c. Introduction of new plant species into an area, or a barrier to the normal replenishment of existing species?			X

	Yes	Maybe	No
6. Animal Life. Will the project result in:			
a. Changes in the diversity of species, or numbers of any species of animals (birds, land animals, including reptiles, fish and shellfish, benthic organisms, insects or microfauna)?			X
b. Loss or disturbance of a nesting area for resident or migrating birds?		C	
c. Reduction of the numbers of any unique, rare or endangered species of animal?			X
d. Introduction of new species of animal into an area, or result in a barrier to the migration or movement of animals (or fish)?			X
e. Deterioration of existing fish or wildlife habitat?			X
7. Land Use/Community Plans and Values. Will the project result in:			
a. Alteration or nonconformance with regional, federal, state or local land use plans and policies of the surrounding area?			X
b. Conflict or inconsistency with adopted policies, plans and goals of the community where the project is located?			X
c. Deterioration of the integrity or quality of the surrounding neighborhood? Loss of privacy or security to residents over the long term?			X
d. Generation of a substantial public controversy resulting from environmental concerns?			X

	Yes	Maybe	No
8. Economic. Will the project:			
a. Foster economic or population growth, either directly or indirectly, in the surrounding area (particularly if faster than planned for)?			X
b. Remove a major constraint or obstacle to growth?			X
c. Decrease employment in the community?			X
d. Reduce acreage or yield of an agricultural crop?			X
9. Population. Will the location, distribution, character, or density of the surrounding human population be altered by the project?			X
10. Housing. Will the project adversely affect existing housing or result in the relocation of existing housing?			X
11. Transportation/Circulation. Will the project result in:			
a. An adverse impact upon existing transportation systems?			X
b. Reduction in existing parking facilities, or create demand for new parking?			X
c. Alterations to present patterns of circulation or movement of people and/or goods?			X
d. Increase in traffic hazards to motor vehicles, bicyclists, or pedestrians?			X
12. Public Services. Will the project result in a need for new or altered governmental services in any of the following areas:			
a. Fire or police protection?			X
b. Schools?			X
c. Parks or other recreational facilities?			X

	Yes	Maybe	No
d. Maintenance of public facilities (streets, highways, public transit, etc.)?			X
e. Flood Protection?			X
f. Other governmental services?			X
13. Utilities. Will the project result in a need for new systems, or alterations to the following utilities:			
a. Power or natural gas?			X
b. Communications systems?			X
c. Water?			X
d. Sewers or septic tanks?			X
e. Storm water drainage?			X
f. Solid waste disposal?			X
14. Energy. Will the project result in:			
a. Use of substantial amounts of fuel or energy?			X
b. Substantial demand upon existing sources of energy, or require the development of new sources of energy?			X
15. Public and Environmental Health. Will the project result in:			
a. Creation of any known human health hazard or potential health hazard (excluding mental health but including physical injury)?			X
b. Involve the application, use, or disposal of toxic or hazardous materials?			X
16. Aesthetics. Will the project result in the obstruction or elimination or any scenic vista or view open to the public, or will the project result in the creation of an aesthetically offensive site or structure presently or potentially open to public view?		C	

	Yes	Maybe	No
17. Recreation. Will the project result in an impact upon the quality or quantity of existing recreational opportunities (such as fishing, boating, hiking, horseback riding, bicycling)?			X
18. Archeological/Historical. Will the project result in an alteration of a significant known archeological or historical site, structure, object or building? Is the project in a known archeologically sensitive area?			X
19. Natural Resources. Will the project substantially increase the consumption of an non-renewable natural resource such as minerals, precious metals, prime agricultural land, natural gas, oil, etc.?			X
20. Mandatory Findings of Significance.			
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?			X
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)			X
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)			X

	Yes	Maybe	No
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X

DETERMINATION

On the basis of this Initial Study:

☒ I find the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project.

☐ I find the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Prepared by

ENVIRONMENTAL SPECIALIST
Title

Date: 2/1/79

DISCUSSION OF ENVIRONMENTAL EVALUATION

1.b. Construction of the 800-foot, 6.0-foot-diameter concrete underground culvert extending from the Altamead Drive box culvert will be disruptive during construction; however, when completed, the ground surface will be returned to its original grade. The existing earth channel north of Portland Avenue bridge will be lined with concrete for a distance of about 700 feet; this reach of the channel is not in a prime groundwater recharge area.

1.f. Temporarily increased wind and water erosion of disrupted soil surfaces will occur until these areas stabilize or revegetate. The cumulative amount of soil erosion is considered to be minor. The planned erosion protection measures will reduce channel erosion over the long term.

2.a. Air quality is likely to deteriorate temporarily in the immediate vicinity of construction. Dust and exhaust emissions will impact residents adjacent to construction sites.

3.c Floodwaters will inundate adjacent lands less frequently upon completion of the project.

4. During construction, high noise levels are likely to annoy nearby residents, particularly during construction of the concrete-lined channel near Portland Avenue bridge and the underground culvert adjacent to Altamead Drive.

6.b. Since some construction will take place during the spring, birds nesting in the vegetated reaches of the channel could be disturbed. There are, however, suitable nesting areas along the creek outside the construction sites. Many of the bird species in the creek corridor are adapted to urban conditions and will be minimally disturbed.

16. During construction, grading activity and the presence of equipment will degrade the aesthetic amenities of the creek environment, especially in highly visible residential areas. Installation of sacked concrete riprap slope protection will add a man-made appearance to some areas of the natural creek. No vegetation will be removed since only bare slopes will be protected. Construction of the low floodwalls and berms around El Camino Hospital will have a minor aesthetic impact only during construction, since these facilities will be designed to be compatible with the landscaping and grounds of the hospital.

Areas graded to provide flood control measures along the creek are expected to revegetate naturally.

MITIGATION MEASURES

Construction-related impacts will be mitigated to the extent possible by imposing strict conditions on the contractor performing the work with regard to local noise standards, exhaust emissions, dust suppression, avoidance of water pollution, site maintenance and cleanup procedures, and public safety.

APPENDIX B

PLANTS AND WILDLIFE ALONG THE CREEK CORRIDOR

Major Plant Species

1. Detention Basin Sites (Midpeninsula Regional Open Space District)

coast live oak
interior live oak
arroyo willow
poison oak
california bay
blue elderberry
california buckeye
coyote brush
black walnut
yellow willow
common horehound
black mustard
wild oats
yellow star thistle
california blackberry
wild barley
redberry buckthorn

2. Portland Avenue to Eastwood Place

curly dock
sweet fennel
arroyo willow
california blackberry
california mugwort
wild oats
black walnut
lambs quarter

3. Eastwood Place to Covington Road

coast live oak
black walnut
oregon ash
blue elderberry
california bay
california buckeye
black locust
california blackberry
english ivy
ivyleaf morning glory
coast redwood
valley oak
poison oak
california toyon

4. Covington Road to St. Francis School

coast live oak
black walnut
poison oak
english ivy
monterey pine
oregon ash
english walnut
pinus sp.
virgin's bower
california toyon
sweet fennel
wild oats
california mugwort
blue elderberry
california wild rose
bigleaf maple
red willow
california bay
ivyleaf morning glory
california blackberry

5. St. Francis School to Cuesta Avenue

california wild rose
coast live oak
black walnut
california blackberry
bitter almond
poison oak
hottentot fig
african daisy
monterey pine
white alder

6. Cuesta Avenue to Marilyn Drive

cedar sp.
english evy
california mugwort
apricot
prune plum
california blackberry
bitter almond
poison oak
foxtail
malva sp.
curly dock
black walnut
california bay
lombardy poplar
red willow
periwinkle
algerian ivy
sweet fennel
coast live oak
pyracantha
spearmint
bermuda grass
castor bean
sedge
wild oats

7. Marilyn Drive to Hale Creek Confluence

black walnut
blue elderberry
poison oak
bamboo
california blackberry
english walnut
wild oats
foxtail
lombardy poplar
arroyo willow
california mugwort
common horehound
california buckeye
english ivy
coyote brush
california bay
japanese flowering plum
longleaf acacia
red willow
california toyon
castor bean
milkweed
spearmint
wild radish
sweet fennel
california wild rose
prickly oxtongue
coast live oak
periwinkle

Observed Wildlife

brown towhee
house sparrow
mockingbird
scrub jay
robin
california ground squirrel
black-tailed deer (only at Midpeninsula Regional Park site)
mourning dove
song sparrow
california thrasher
red-tailed hawk
california quail

APPENDIX C

PUBLIC PARTICIPATION THROUGH INFORMATION BROCHURE AND QUESTIONNAIRES

An information brochure and the first questionnaire were mailed prior to a scheduled public meeting. The information brochure contained the problem identification and some of the possible solutions. The brochure is included at the end of this appendix.

The questions included in the first questionnaire and the public response to the questions are summarized in the following paragraphs.

QUESTIONNAIRE 1

Q. 1 In which way do you use or enjoy the resources of Permanente Creek?

A. 1 11% Recreation

41% Scenic or aesthetic

29% Land for residential use

0% Land for commercial use

19% Other (specify)

Few people complained of negative enjoyment because of overgrowth and dumping in the creek.

Q. 2 In your opinion, which of the following are major problems affecting Permanente Creek?

A. 2 5% Loss of fish and wildlife

7% Loss of creek vegetation

19% Flooding potential

18% Erosion and sedimentation

0% Lack of open space

0% Lack of natural recreation areas

8% Pollution caused by waste disposal practices

32% Insufficient creek maintenance

10% Other (specify)

Q. 3 Do you feel the flood problem is severe enough to justify a flood control project? Explain why or why not.

A. 3 68% of the respondents do not feel that the flood problem is severe enough to justify a project.

Q. 4 Are there any special problems related to the creek which you would like to discuss personally with us? If so, please list them and we will contact you.

A. 4 The following problems were mentioned:

a) Local creek maintenance problem
b) Area of flooding in flood map should be revised to exclude high spots
c) Unclog the inlet to Permanente Creek diversion orifice so more water would flow down the creek
d) There would be no need of the project if the diversion channel was built large enough in 1960

Q. 5 Of the solutions we described, which alternative do you prefer and why?

A. 5
58% for flood detention ponds in upper watershed
25% for flood insurance protection
11% for no project and no insurance
3% for enlarging the existing diversion channel
3% for constructing a new diversion channel

Q. 6 What other solutions do you suggest that we consider?

A. 6 Other suggested solutions were:

a) Just maintain the existing facilities
b) Improve only bottlenecks on the creek and diversion channel
c) SCVWD pay for the flood insurance premiums

The second questionnaire was mailed following the public meeting. The questions and the public response are presented in the following paragraphs.

QUESTIONNAIRE 2

Q. 1 What is your opinion of the method we used to notify you of the study and the workshop meetings? How could we improve it?

A. 1 98% approved the method

Some comments were a) the announcement of the meeting should be made further ahead of time; b) use separate maps to indicate different alternatives.

Q. 2 Did the Information Brochure give you enough information to acquaint you with some of the problems on Permanente Creek and their solutions? What additional information should we have provided? What could we have left out?

A. 2 86% approved the way in which the brochure is written. The others suggested that we should also include the following in our brochure: a) funding source, financing methods, taxes, and current District budget; and b) more information about mandatory flood insurance.

Q. 3 Was our presentation at the workshop meeting clear? Was it complete? What changes would you suggest for future meetings like this?

A. 3 71% believed that the presentation was clear. Few suggestions were as follows: a) fewer slides and b) more time for questions.

Q. 4 Did we adequately address the issues and questions you raised? How could we improve in this area?

A. 4 80% of those who attended the meeting think we had adequately addressed the issues. The other comments were as follows: a) give details of method of funding the project, b) allow more time for questions and answers, and c) use written questions and verbal answers technique to control the meeting.

Q. 5 It appears that Alternative 3 had majority support of the attendees at the meeting. Would you also support Alternative 3 over other alternatives? If not, which one would you like to support?

A. 5 The support for various alternatives was as follows: a) Alternative 1 (No Project) - 9%; Alternative 2 (Enlarge Existing Diversion Channel) - 4%; Alternative 3 (Flood Detention Ponds) - 87%; and Alternative 4 (New Diversion Channel) - None.

Q. 6 Would you like us to investigate any other alternative? Please describe it.

A. 6 a) Change Altamead box culvert to open channel

b) Improve bottlenecks

c) Maintain the creek

Q. 7 We will have two more meetings before the study is either approved or disapproved; the public hearing on the draft report of the study and the public hearing on the fnal report. Do you think any more workshops or meetings are necessary? Why?

A. 7 84% indicated that no further meetings or workshops were necessary.

Q. 8 Please add any other comments you would like to make about this study.

A. 8 The following comments were received:

a) Concept of one percent is not easily understood

b) The accuracy of flood map is questioned

c) Flood insurance should not be mandatory

d) District should establish a schedule of regular maintenance

e) Improve Altamead box and Portland bridge first, ponds later.

f) The District should hire a consultant to evaluate the alternatives.

The following pages present the Information Brochure that was mailed to the residents.

Santa Clara Valley Water District

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600

October 26, 1977

Dear Resident:

Your home is located near Permanente Creek and the Permanente Diversion Channel. The Santa Clara Valley Water District, a public agency, is conducting a study to determine the extent of the flood and sedimentation problems and to evaluate possible solutions to these problems. Workshop meetings will be held in the study area to discuss the problems and possible solutions with you, the affected public. Since your house could be affected by the potential flooding or by the solution selected, we would encourage you to attend the workshops.

The first workshop will be held on November 10, 1977 at 7:30 p.m. in the Audio Visual Room (Building 300) of the St. Francis High School, 1885 Miramonte Avenue. We are enclosing an information brochure for the Permanente Creek Flood Control Planning Study which describes the workshops, the study area, the problems, and some possible solutions. It also includes a short questionnaire at the end. Please fill out the questionnaire and either mail it to us or bring it to the workshop.

Again, we encourage you to participate in this study as your ideas and comments can help lead to the desired results. If you have any questions, please call me at Extension 303.

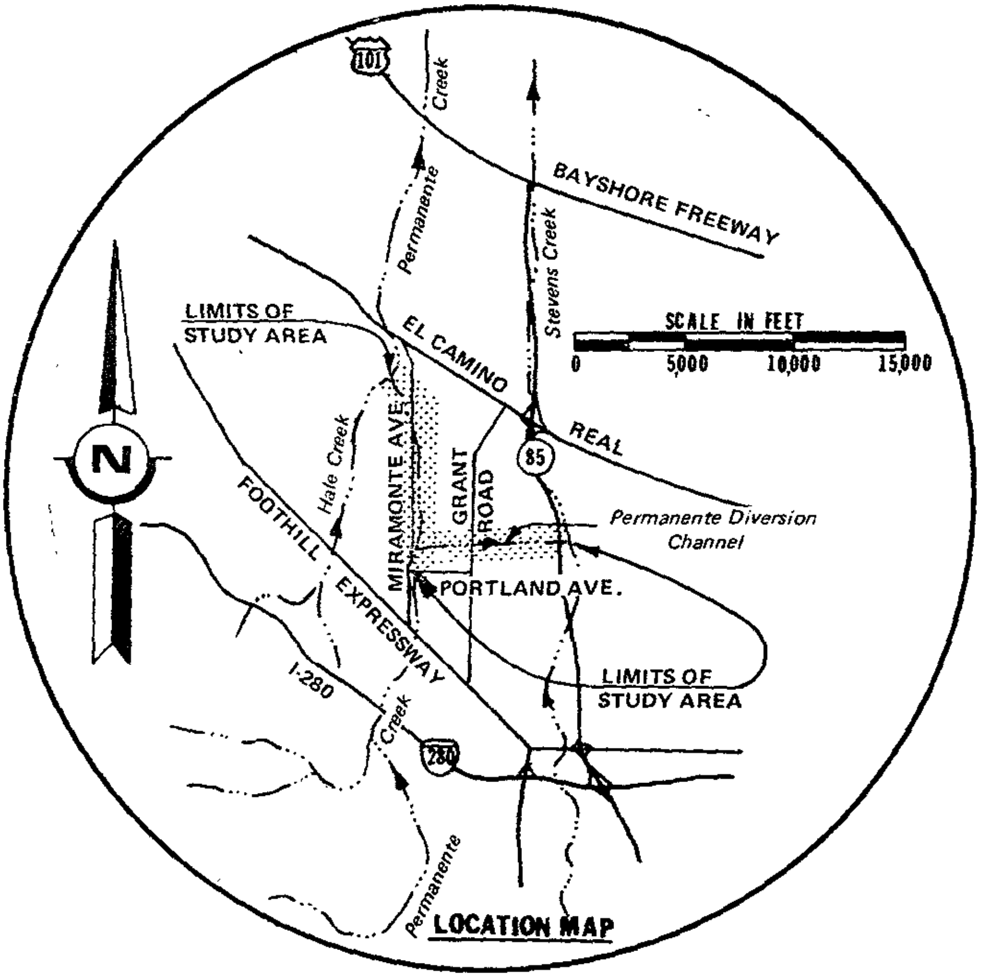
Sincerely,

Joe Pandit
Associate Civil Engineer
Predesign Division

Enclosure

INFORMATION BROCHURE

PERMANENTE CREEK FLOOD CONTROL PLANNING STUDY



LOCATION MAP

NOVEMBER 1977

Santa Clara Valley Water District

PERMANENTE CREEK - FLOOD CONTROL PLANNING STUDY

Introduction

Permanente Creek and the Permanente Diversion Channel are not large enough to contain the streamflow which would occur during very large storms. Because of this, the Santa Clara Valley Water District is studying what would happen when streamflows and flooding from these larger storms occur, where the floodwaters would go, what damages would be created, and what can be done to reduce these damages. To insure that the problems related to Permanente Creek are accurately defined and to insure that the concerns and preferences of the affected public are properly considered, the Water District will be holding workshops in the community. This brochure has been prepared to give the people who may be affected by the flooding or by a future project, some background information on the workshops, the study area, the flood and related problems, and the types of flood control solutions being considered. It also provides a questionnaire at the end for people to submit their comments in writing.

The Workshops

The first workshop will be held on November 10, 1977 at 7:30 p.m. at the St. Francis High School. At this meeting, the District staff will review the material covered in this brochure and then ask for your comments and suggestions. If sufficient interest is shown, a citizens advisory committee will be formed and subsequent workshops held. Your participation at these meetings is sincerely desired by the Water District.

After your comments are received through the workshop program, the District staff will continue its design work. The staff will evaluate the possible solutions and their various impacts, and select the solution which best satisfies the concerns of the public and meets the District's objective of providing flood protection in a manner compatible with the desired quality of life in the community. Following that selection, a report will be prepared and circulated in the community. Two public hearings will be held by the Water District Board of Directors to obtain official public reaction to the proposed solution.

The Study Area

This flood control planning study covers the portion of Permanente Creek from Portland Avenue to Hale Creek near Mountain View Avenue. It also includes the Permanente Diversion Channel which starts at Miramonte Avenue and runs easterly parallel to Eastwood Court, Altamead Drive, and Preston Drive to Stevens Creek. The study area is located in the cities of Los Altos and Mountain View.

Figure 1 is a map of the area drained by Permanente Creek (the watershed) and the general study area. Permanente Creek drains a portion of the Montebello Ridge area and the foothill areas west of Monte Vista and south of Los Altos Hills. The total area drained is ten square miles at the junction with Hale Creek. At the point where the creek enters San Francisco Bay, it drains seventeen square miles.

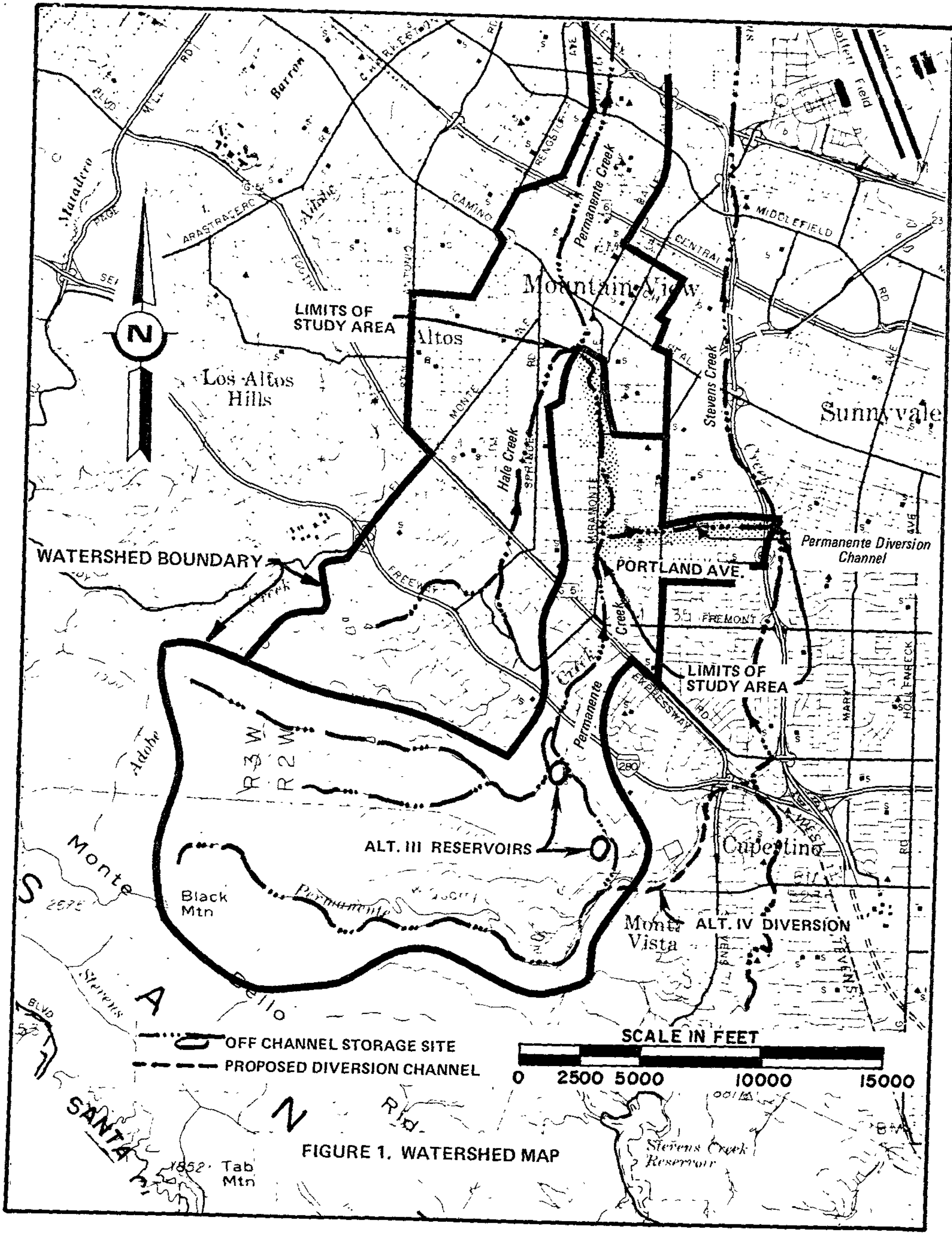


FIGURE 1. WATERSHED MAP

In 1960, the Water District constructed the Permanente Diversion Channel to divert most of the larger streamflows in Permanente Creek to Stevens Creek. This was necessary to reduce the flooding which had taken place along Permanente Creek near El Camino Real and Bayshore Freeway. The decision to build the concrete-lined diversion was based on the conclusion that Stevens Creek was better able to carry these streamflows than was the downstream Permanente Creek channel. However, the diversion channel was not built large enough to carry all possible flows.

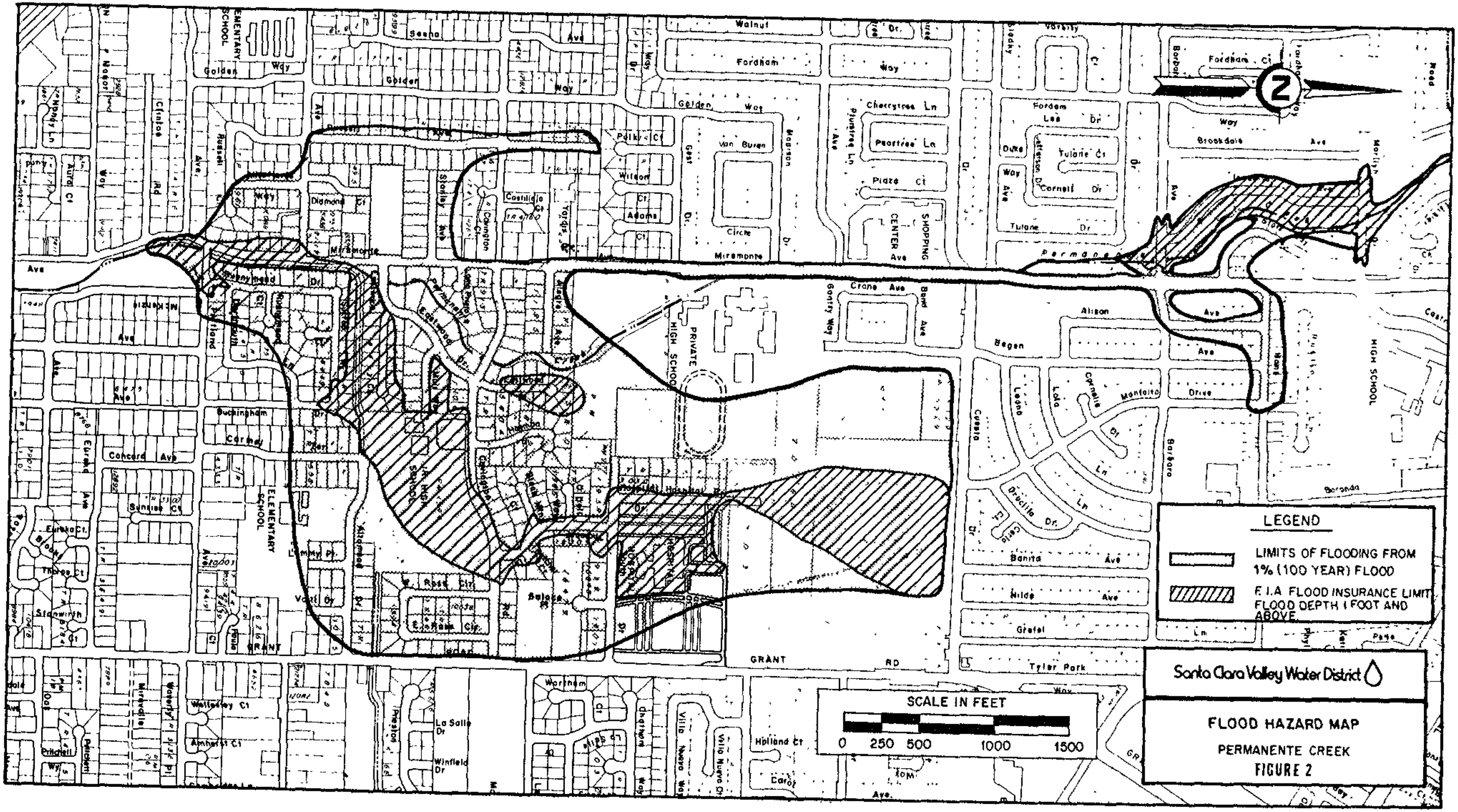
The Problems

There have been two primary problems identified relative to Permanente Creek: the flood problem and the sedimentation problem. The flood problem is created by the inadequate size of the channels in the study area. The sedimentation problem is the result of erosion in the upper portion of the creek which deposits sand, silt, and gravel in the study area channels. Flooding can be expected to occur once every 25 years on the average.

Historically, the two largest recorded floods in this area were in December 1955 and April 1958. In 1955, approximately 770 acres of land were flooded around El Camino Real resulting in the evacuation of about 100 people. In 1958, flooding was limited to a narrow strip along the creek in the study area with a larger flooded area near Middlefield Road.

The Water District has adopted the 100-year flood or 1% flood as its criterion for evaluating flood problems. This is consistent with the practices of other flood control agencies and the Federal Flood Insurance Administration (FIA). The 1% flood is the flood which has a 1% chance of occurring in any year. Over a long period of history, floods larger than this will occur once every 100 years on the average. Nonetheless, it is possible to have two 1% floods in one year and it is also possible to not have any 1% floods in a two-hundred-year period. The use of the 1% flood as a design and evaluation standard is based on studies which show that this is the flood which is most economically feasible to protect against.

Figure 2 is the flood hazard map for Permanente Creek in the study area. It shows the limits of flooding for a 1% flood if it were to occur today. Two boundary areas are shown. The narrower cross-hatched band outlines the area where significant flooding and damages would occur. In this area, floodwater depths during this flood would be more than one foot, relative to the crown of the road. The maximum depth of flooding would exceed three feet. The remainder of the flood area (shaded) would have depths less than one foot. The area in the cross-hatched portion would be subject to the Federal Flood Insurance requirements. The flooded area is approximately 260 acres of which 60 acres are in the significant flooding area. The significant flooding area includes 70 homes, the Covington Junior High School, and the El Camino Hospital. Total damages from the 1% flood would be approximately $1,170,000. This includes structural damage, personal property damage, and indirect damages related to emergency activities and business losses.



THE FLOOD HAZARD BOUNDARIES SHOWN ON THIS MAP ARE PRELIMINARY AND ARE SUBJECT TO REVISION AS THE PLANNING STUDY AND THE F.I.A. STUDY ARE FINALIZED'

The sedimentation problem contributes to the flood problem. As sand and gravel washed downstream from the foothills collects in the creek, the channel gets smaller and has less room for floodwaters. This has been occurring in portions of Permanente Creek and the Permanente Diversion Channel. The primary result could be an increase in the frequency of flooding.

Some Possible Solutions

Based on the problems described in this brochure and the general objective of preventing flooding, the Water District is studying four possible solutions. Three of these solutions would prevent flooding during the 1% flow; one solution would not prevent flooding but, instead, would rely on emergency actions to reduce the flood damages. These four solutions were screened out of a larger list of flood control concepts which were considered initially. The four solutions described in this brochure are not the only ones which can be studied further. Ideas submitted at the workshops or in the questionnaires will be given consideration along with those discussed here. The four alternative solutions are described on the following pages by (1) discussing the objective of the solution, (2) describing the principal features, (3) presenting the estimated cost, (4) listing the positive and negative aspects, and (5) presenting a sketch of the principal features. The alternatives discussed relate specifically to the flood problem. The sedimentation problem is incidental to that and will be solved in conjunction with the selected flood control alternative.

ALTERNATIVE NO. I - EMERGENCY ACTIONS

OBJECTIVE: To reduce flood damages by emergency action prior to, during, and after the flood.

PRINCIPAL FEATURES: This solution would include a more intensive maintenance program, a short-term flood warning system, emergency evacuation, post-flood cleanup and assistance activities, and the use of flood insurance to recover flood damage losses.

TOTAL PROJECT COST: A precise cost for this solution cannot be estimated. The costs (flood damages) would depend on the size of the flood. Flood insurance premiums at the present time are approximately $122 per year for the structure and its contents. These rates will change when the final insurance rate studies have been completed by the Federal Government.

POSITIVE ASPECTS

1. The creek environment would not be changed.
2. Adjacent residents would not be affected by construction activities.
3. Public funds would only be expended for emergency actions.

NEGATIVE ASPECTS

1. The flood problem will still exist.
2. The El Camino Hospital, Covington Jr. High School, and 70 homes would be in danger of significant flooding.
3. Annual insurance premiums could be about $8,500 for all homes in the significant flood area.

ALTERNATIVE NO. II - ENLARGED DIVERSION CHANNEL

OBJECTIVE: To provide all the additional flood-carrying capacity needed in an enlarged Permanente Diversion Channel.

PRINCIPAL FEATURES: This solution would involve the partial rebuilding of the Diversion Channel from Permanente Creek to Stevens Creek. The new channel would be a concrete-lined section replacing a portion of the existing channel. The Altamead Drive box culvert would be enlarged and all street crossings and the Stevens Creek Freeway crossing would be enlarged. Upstream of the diversion, the creek would be enlarged from Portland Avenue, including the Portland Avenue bridge.

TOTAL PROJECT COST: $3,700,000

POSITIVE ASPECTS

1. The creek downstream of the Diversion Channel would not be disturbed.
2. Flood insurance requirements would be removed.
3. The 1% flood problem would be solved.
4. Construction would be confined to previously impacted areas; environmental damage would be low.

NEGATIVE ASPECTS

1. Very high initial cost.
2. Construction-related impacts would be significant.
3. Could add to the flood potential on Stevens Creek.

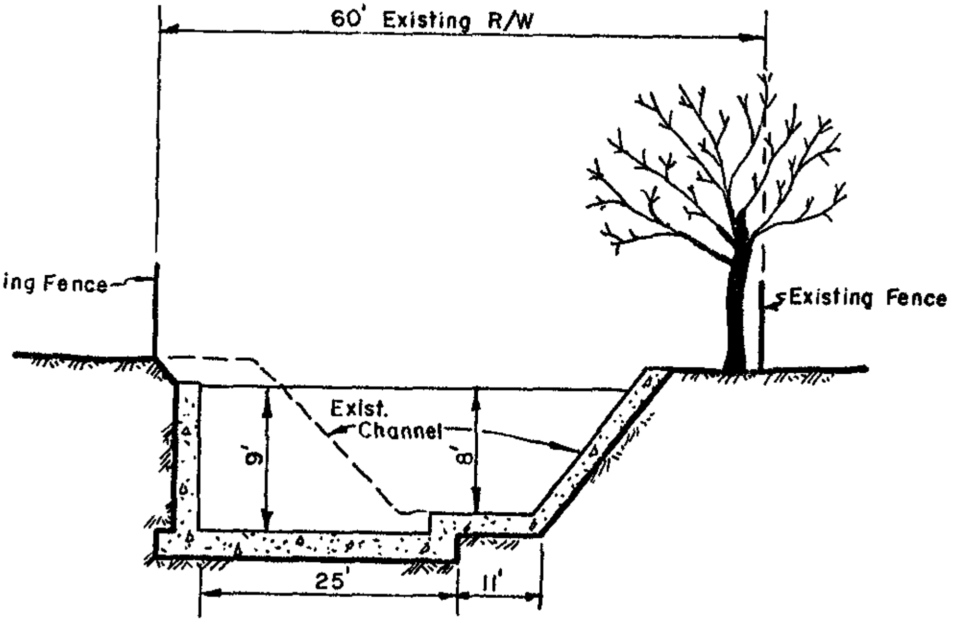


FIG. 3. TYPICAL CROSS SECTION ALTERNATIVE II

ALTERNATIVE NO. III - RESERVOIRS

OBJECTIVE: To reduce the size of the flows in the study area by upstream storage of runoff.

PRINCIPAL FEATURES: This solution would consist of the construction of two small reservoirs upstream of Highway 280 near the St. Joseph's Seminary, the enlargement of the creek from Portland Avenue to the diversion, the enlargement of the box culvert under Altamead Drive, and local enlargements along the creek downstream of the diversion.

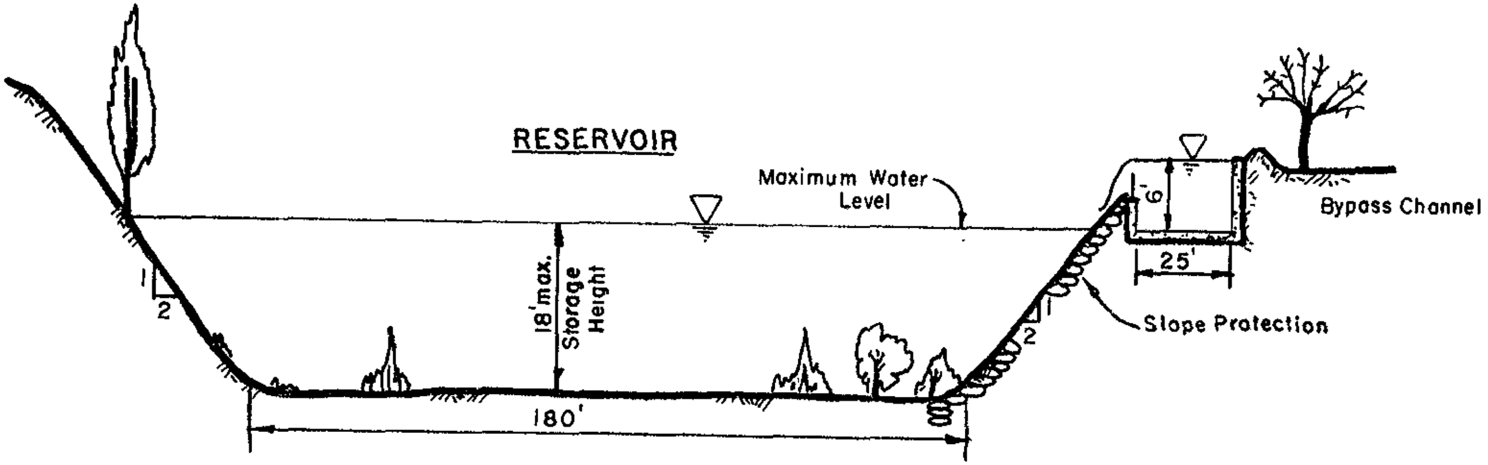
TOTAL PROJECT COST: $2,000,000

POSITIVE ASPECTS

1. Lowest cost of the structural alternatives.
2. The creek environment would not be significantly impacted in most areas.
3. The flood problem would be solved.
4. Flood insurance requirements would be removed.
5. Impact on adjacent residents during construction would be minimal.
6. Reservoirs can be used for recreation purposes.

NEGATIVE ASPECTS

1. Need to acquire large land areas for the reservoirs.
2. The creek environment would be significantly impacted in some upstream areas.
3. The operational aspects are complicated and would require detailed studies before constructing the two reservoirs.



*See Fig.1 for proposed off-channel storage basin location.

FIG. 4. TYPICAL CROSS SECTION ALTERNATIVE III

ALTERNATIVE NO. IV - NEW DIVERSION CHANNEL

OBJECTIVE: To reduce the size of the flows in the study area by diverting some runoff to Stevens Creek.

PRINCIPAL FEATURES: This solution would consist of the construction of a new concrete-lined diversion channel along Heney Creek upstream of Highway 280 near Permanente Road to Stevens Creek near Homestead Road.

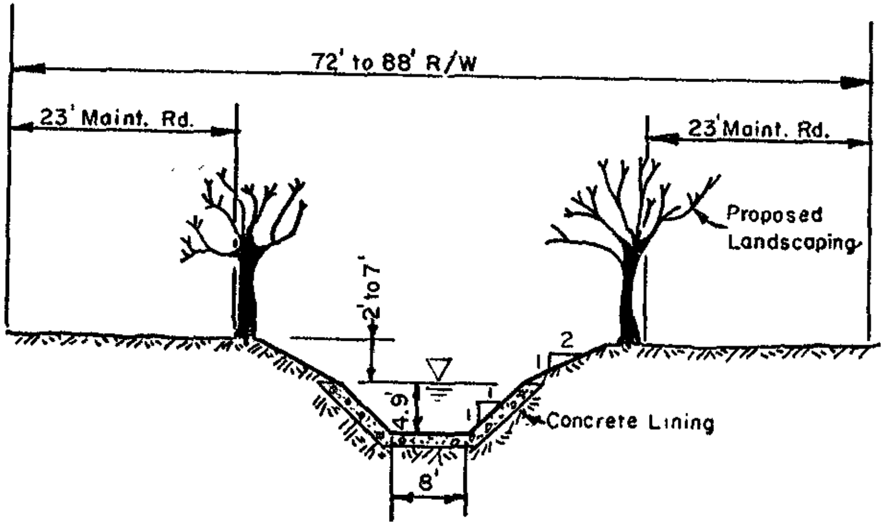
TOTAL PROJECT COST: $2,600,000

POSITIVE ASPECTS

1. The existing creek environment and diversion would not be changed.
2. The flood problem would be solved.
3. Flood insurance requirements would be removed.
4. Construction impacts to residents would be negligible.

NEGATIVE ASPECTS

1. Substantial land required for the new channel.
2. The environmental impact on Heney Creek may be significant.
3. Requires tunneling through Highway 280 and a high hill.
4. Could add to the flood potential on Stevens Creek.



HENEY CREEK DIVERSION

FIG. 5. TYPICAL CROSS SECTION ALTERNATIVE IV

QUESTIONNAIRE

In this brochure, we have described our understanding of the problems related to Permanente Creek and the Permanente Diversion Channel, and the possible solutions to these problems. Now, we would like to know your ideas, attitudes, and preferences to help us with our remaining work.

1. In which way do you use or enjoy the resources of Permanente Creek?

_____ Recreation
_____ Scenic or aesthetic
_____ Land for residential use
_____ Land for commercial use
_____ Other (specify)

2. In your opinion, which of the following are major problems affecting Permanente Creek?

_____ Loss of fish and wildlife
_____ Loss of creek vegetation
_____ Flooding potential
_____ Erosion and sedimentation
_____ Lack of open space
_____ Lack of natural recreation areas
_____ Pollution caused by waste disposal practices
_____ Insufficient creek maintenance
_____ Other (specify)

3. Do you feel the flood problem is severe enough to justify a flood control project? Explain why or why not.

4. Are there any special problems related to the creek which you would like to discuss personally with us? If so, please list them and we will contact you.

Santa Clara Valley Water District

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600

November 22, 1977

Dear Resident:

On November 10, 1977, we had a meeting at St. Francis High School to discuss the Permanente Creek Planning Study. It was an interesting meeting where we had an opportunity to exchange our ideas with those of the community. About 65 people attended the meeting. If you were not able to attend due to some other commitment, the following information will give you some idea of the proceedings of the meeting.

At the meeting, the District staff presented an overview of the District organization and its activities and also discussed the alternatives presented in the brochure. A slide presentation included the aerial views of the existing creek and the diversion, the problems and the possible solutions.

During the discussions, the attendees repeatedly brought to our attention that the District should increase the creek maintenance activities to reduce flood hazard. The District staff agreed with the suggestion stating that although an improved maintenance program could slightly increase the flow capacity of the creek, it will not eliminate the flood hazards during occurrence of the one percent flood and that future property owners within the area of significant flooding will still have to purchase flood insurance. Some of the attendees pointed out that the flood insurance requirement could affect their property values also.

We also received the following comments and suggestions at the meeting:

1. Budget more funds for maintenance.

2. Improve only Altamead box culvert to match the flow capacity of the rest of the diversion channel.

3. Convert Altamead box culvert into open channel to improve its flow capacity and for easier handling of the deposited silt.

4. Improve first the structures that cause flow restriction and later the rest of the project.

We will review these comments and suggestions in detail and incorporate in our study if we find that they would contribute in solving the problems.

One important point we failed to include in the brochure was the manner in which the project will be financed if it was constructed. At the meeting it was clarified that if the project were approved by the District Board of Directors, it will be constructed using the current reserve funds and the anticipated income from the current taxes. An assessment district will not be formed to finance the work.

At the meeting we also conducted a "straw vote" to find out how much support each alternative had. The results were: about 30 votes for Alternative 3 (upstream reservoirs), about 10 votes for Alternative 1 (only emergency actions), 1 vote for Alternative 2 (enlarged diversion) and no votes for the Heney Creek diversion.

We appreciate your input via the first questionnaire that was attached to the brochure. To get post-meeting comments from the community, we have attached a second questionnaire with this letter. Will you please take some time to fill it out and return it to us?

Although a few modifications to the alternatives were recommended by the attendees at the meeting, no new alternatives were suggested. Therefore, we do not see a need for any additional workshops or meetings until we prepare a draft report with a recommended project. However, if there are any significant changes in the alternatives presented in the brochure, or, if the community desires another meeting before we prepare a report on the study, we will schedule another meeting.

In the meantime, I am looking forward to your additional input through the second questionnaire. Please mail it soon.

Sincerely yours,

Joe Pandit
Associate Civil Engineer
Predesign Division

PERMANENTE CREEK
FLOOD CONTROL PLANNING STUDY

QUESTIONNAIRE #2

In our first questionnaire, we asked for your ideas, attitudes, and preferences regarding the problems and solutions on Permanente Creek and the Permanente Diversion Channel. Now, we would like your comments on the approach we used in involving you in this study. We want to know whether or not you felt adequately informed and involved. Please answer the following questions:

1. What is your opinion of the method we used to notify you of the study and the workshop meetings? How could we improve it?

2. Did the Information Brochure give you enough information to acquaint you with some of the problems on Permanente Creek and their solutions? What additional information should we have provided? What could we have left out?

3. Was our presentation at the workshop meeting clear? Was it complete? What changes would you suggest for future meetings like this?

4. Did we adequately address the issues and questions you raised? How could we improve in this area?

5. It appears that Alternative 3 had majority support of the attendees at the meeting. Would you also support Alternative 3 over other alternatives? If not, which one would you like to support?

6. Would you like us to investigate any other alternative? Please describe it.

APPENDIX D

NATIONAL FLOOD INSURANCE PROGRAM

Natural disasters have, from time to time, created great personal hardships and economic distress. Disaster relief and reconstruction measures have placed an increasing burden on the nation's resources and experience indicates that more careful attention to land use and construction standards can diminish this burden. The National Flood Insurance Program was created by Congress in 1968 to reduce the impact on communities and individuals of the most prevalent natural disaster in the United States, property damage due to floods and flood-related hazards.

The Program enables property owners to acquire flood insurance at affordable rates through a cooperative program with the private insurance companies. Before this insurance can be obtained, the local community (city or county) must join the program and, if flood hazard areas are identified, adopt and enforce floodplain management measures that will reduce the impact of future floods. These flood hazard areas are shown on maps issued by the Federal Insurance Administration.

For a community that joins the Program prior to the completion of a flood insurance rate study, the early sale of insurance is offered to all property owners. For property owners located in identified flood hazard areas the purchase of flood insurance for structures is required to obtain new FHA, GI, or conventional loans from a bank or savings and loan. This early identification of flood hazard areas is shown on flood hazard boundary maps issued by FIA to the local community. The insurance is offered at subsidized rates to cover flood damage to structures and, under a separate policy, their contents. The annual subsidized insurance rates in dollars per $100 of coverage and limits of coverage offered are:

Type of Structure	Rate in Dollars	Coverage in Dollars
(1) Single-family dwellings		
structure	0.25	35,000
contents	0.35	10,000
(2) All other buildings		
structure	0.40	100,000
contents	0.75	100,000

During this early phase only general land use and construction standards that are normally enforced through our city and county building permit system are required. For communities not joining the program, FHA and GI loans will not be available to property owners located in identified flood hazard areas.

Following the completion of a flood insurance rate study and the adoption and enforcement of detailed floodplain management measures by the local community, a second amount of non-subsidized insurance (at actuarial rates) will be made available. For existing structures this second level of insurance coverage is offered at non-subsidized rates but the option of subsidized or non-subsidized insurance is available for the first level of coverage. For structures built after the actuarial rates are adopted, only non-subsidized insurance is offered. Annual flood insurance rates in dollars per $100 of coverage and the limits of coverage are:

Type of Structure	1st Level of Coverage		2nd Level of Coverage	
	Rate	Coverage	Rate	Coverage
(1) Single-family dwelling				
structure	*Varies to $0.25	$ 35,000	*Varies	to $150,000
contents	*Varies to $0.35	10,000	*Varies	50,000
(2) All other residential buildings				
structure	$0.40	100,000	*Varies	150,000
contents	0.75	100,000	*Varies	150,000
(3) Small business	0.40	100,000	*Varies	150,000
	0.75	100,000	*Varies	200,000
(4) All other buildings	0.40	100,000	*Varies	100,000
	0.75	100,000	*Varies	100,000

*Non-subsidized rate based on the estimated risk.

For property owners required to purchase flood insurance for loan purposes, a second level of coverage equal to the amount offered in the early phase (subsidized insurance) is required. For single-family dwellings this total amount is the fair share of the loan or $75,000, whichever is lower.

Floodplain management measures to be adopted and enforced by the local community will in general include a moratorium on construction in the designated floodway, a limit on the number of structures that can be built in the flood hazard area outside the floodway, and flood damage resistant construction standards. Identified flood hazard areas, where floodplain management measures must be enforced and where flood insurance purchase requirements apply, are shown on Flood Insurance Rate Maps issued by FIA to the local community.

Flood insurance policies may be purchased through any licensed agent and are serviced through EDS Federal Corp. Inquiries of insurance-related matters should be made to National Flood Insurance Program, Post Office Box 34294, Bethesda, Maryland 20034.

Procedures which permit a community or individual to appeal a flood hazard designation by FIA have been established. These include appeals for certain insurance premium refunds if the flood hazard designation is removed or modified.

Further details about the program can be obtained from the Santa Clara Valley Water District, your local community, or the Flood Insurance Office of the Department of Housing and Urban Development. The local FIA office is in San Francisco, Post Office Box 36003, San Francisco, California 94102, telephone (415) 556-3543.

APPENDIX E

DETAILED COST ESTIMATES
CONSTRUCTION COSTS

Proposed Work	Quantity	Unit Cost (Dollars)	Item Cost (Dollars)
IMPROVEMENTS BETWEEN PORTLAND AVENUE AND THE DIVERSION PIPE			
Removing beam from upstream of Portland Avenue	1	Lump Sum	1,000
Concrete lining	800 c.y.	160 c.y.	128,000
Telemetric water monitoring system at Station 32A	1	Lump Sum	1,000
Access ramp	1	Lump Sum	50,000
Removing a portion of existing wall at diversion pipe and providing trashrack at the opening. Also sealing the existing orifice at the bottom of the channel	1	Lump Sum	3,500
IMPROVEMENTS NEAR ALTAMEAD DRIVE BOX CULVERT AND GRANT ROAD			
Relocating existing northside fence	300 ft.	5/foot	1,500
Relocate (if necessary) two storm drain inlets	2 No.	Lump Sum	2,500
Retaining wall (where necessary) along the road in school yard	14 c.y.	350/c.y.	5,000
Remove existing concrete lining from north side, upstream and downstream of the culvert	10 c.y.	150/c.y.	1,500
Transitions include retaining walls upstream and downstream of the culvert	67 c.y.	300/c.y.	20,000
Extend concrete line vertically 3.5 feet upstream of the culvert	90	250	23,000
800-foot-long, 6-foot-diameter pipe	800 ft.	175/foot	140,000
Access ramp at Grant Road	1	Lump Sum	35,000
IMPROVEMENTS AT HIGHWAY 85			
Cutting and removal of 4-foot-wide lining from bottom and constructing a 4' x 3.5' recess		Lump Sum	15,000
IMPROVEMENTS ALONG PERMANENTE CREEK			
Sacked concrete lining near Blossom Valley Shopping Center and Marilyn Ave.	350 s.y.	100/s.y.	35,000
Marilyn Avenue Culvert (14'x6'x50')	700 s.f.	60/s.f.	42,000

APPENDIX E (continued)

DETAILED COST ESTIMATES
CONSTRUCTION COSTS

Proposed Work	Quantity	Unit Cost (Dollars)	Item Cost (Dollars)
FLOOD PROOFING AROUND EL CAMINO HOSPITAL			
Berm	167 c.y.	9/c.y.	1,500
Floodwalls	90 c.y.	300/c.y.	27,000
Gates at service area and other entry points	4 No.	Lump Sum	16,000
Removal of tarred surface (860 s.f.), curb (430 feet) and installation of wheel stoppers		Lump Sum	6,500
Wall and gate around emergency well		Lump Sum	5,000
Landscaping and Utility Relocation			16,000
Subtotal			576,000
20% Miscellaneous Construction			115,000
Subtotal			691,000
15% Contingencies			104,000
Total Construction Cost			795,000
20% Engineering, Administration and Inspection			159,000
Subtotal			954,000
Right of Way Costs			10,000
TOTAL PROJECT COST			964,000

APPENDIX F

GLOSSARY OF TECHNICAL TERMS

Acre-Foot	The volume of water required to cover one acre of land to a depth of one foot (approximately 325,000 gallons).
Ad Valorem Tax	A tax based on property value.
Backwater Analysis	A method of computing water surface levels in a given stream of known physical characteristics while carrying a given amount of the water flow.
CFS or Cubic Feet per second	A rate of flow that would fill a a container of one cubic foot size, that is about 7 1/2 gallons, in one second.
Design Flow	The magnitude of stream flow that is used in design of channel improvements and structures across the channels.
Drainage Area	Area that drains into a body of water such as a stream or a reservoir.
Easement	Right of way granted by a property owner to the Santa Clara Valley Water District for an expressed purpose of either constructing flood and erosion

	control improvements or maintaining the channel. The property owner retains the ownership rights on the area under the easement but his use of the area is restricted only to those uses which are compatible with the District uses.
Erosion	Loss of soil from bank or bed of a creek, causing undercutting of banks; ultimate result could be bank failure.
Excavated Floodplain	Areas excavated adjacent to a channel to provide larger flow area during the floods.
Flood	The temporary inundation of lands normally dry; any waters escaping from a creek or river.
Flood Control Zone	A zone established by the SCVWD for the purpose of limiting use of tax funds available from a certain area (zone) for the improvements and services in that particular area only. There are five flood control zones in Santa Clara County.
Floodplain	Low lying areas that are flooded during high flows in a channel.

Floodwall	A wall constructed adjoining channel to prevent flooding of the surrounding areas.
Freeboard	Vertical distance between the top of an embankment adjoining a channel and the water level in the channel. It is a factor of safety designed into a project.
Gabions	A large size (about 9' X 3' X 1 1/2') wire basket filled with graded rocks and gravels. These baskets are used as erosion protection works on channels.
Hydrology	The science dealing with the origin, distribution and circulation of waters of the earth such as rainfall, streamflow, infiltration, evaporation, and groundwater storage.
Low Flow Channel	That section of stream which carries the more frequent, periodic streamflows.
Mean Sea Level (MSL)	A level midway between mean high and mean low tides in an open sea.
Modified Floodplain	Areas confined by embankments which are constructed at some distance away from the banks of a stream.

Sheetflooding	A shallow (less than a foot) flooding caused by inadequate drainage systems.
Velocity	Speed with which water would flow in a in a channel. It depends on several factors, such as slope, smoothness and uniformity of channel, area of flow and wetted perimeter.
Watershed	Area that drains into a body of water such as a stream or a reservoir.
100-Year or One Percent Flood	The flood event which has a one percent chance of occurring in any year. Over a long period of time, this flood would be equaled or exceeded on the average of once for each 100-year period. For example in a 10,000-year period, there would be 100 of these events.(8)

APPENDIX G

PERSONS TO CONTACT FOR MORE INFORMATION

About this Report

Joe Pandit
Project Engineer
Santa Clara Valley Water District
265-2600, extension 319

About Flood Insurance

Randy Talley
Santa Clara Valley Water District
265-2600, extension 303

About Environmental Considerations

Dr. Bernard Goldner
Santa Clara Valley Water District
265-2600, extension 350

About Creek Maintenance

Donald Erling
Santa Clara Valley Water District
265-2600, extension 360

About Right of Way Acquisitions

Donald Lawrie
Santa Clara Valley Water District
265-2600, extension 261

APPENDIX H

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2. Santa Clara Valley Water District: "Permanente Creek Dam and Reservoir": 1956
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5. Nolte, G.: "Flood Insurance Study, City of Los Altos, Santa Clara County, California ": September 1978
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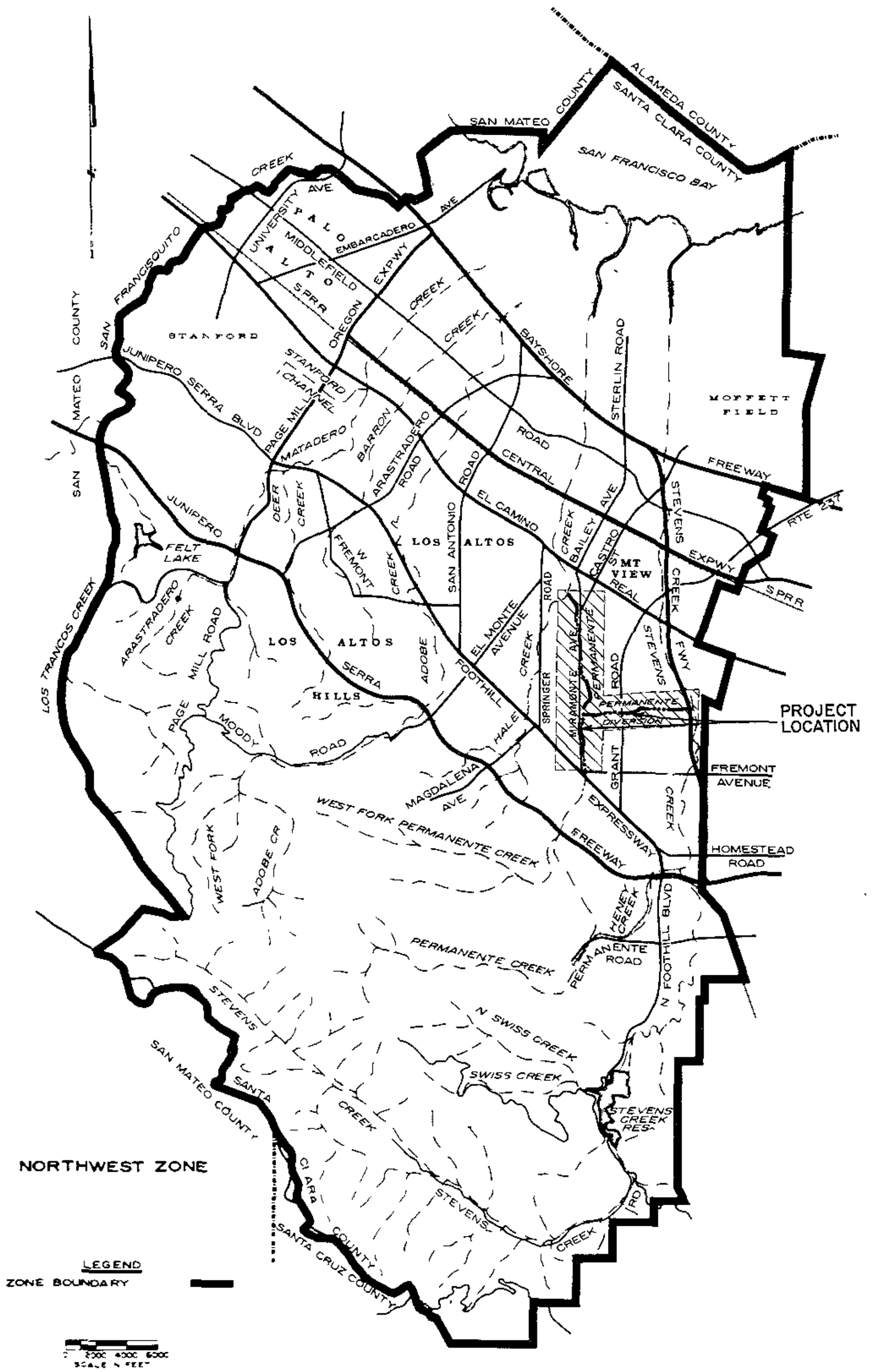


MAP AND GENERAL PLAN

FOR

PERMANENTE DIVERSION CHANNEL

AND

PERMANENTE CREEK

FROM PORTLAND AVE. TO HALE CREEK

Santa Clara Valley Water District

NORTHWEST FLOOD CONTROL ZONE PROJECTS NO. 1023 & 1024

INDEX

SHEET NO.	DESCRIPTION
1	MAP & TITLE PAGE
2	LOCATION & INDEX. MAP
3-9	PLAN AND PROFILE
10	GENERAL PLAN FOR FLOOD PROTECTION MEASURES AT EL CAMINO HOSPITAL

$\frac{1}{10}$ 1 INDICATES DETAIL NUMBER
10 INDICATES NUMBER OF SHEET ON WHICH DETAIL APPEARS

$\frac{A}{10}$ A INDICATES SECTION
10 INDICATES NUMBER OF SHEET ON WHICH SECTION APPEARS

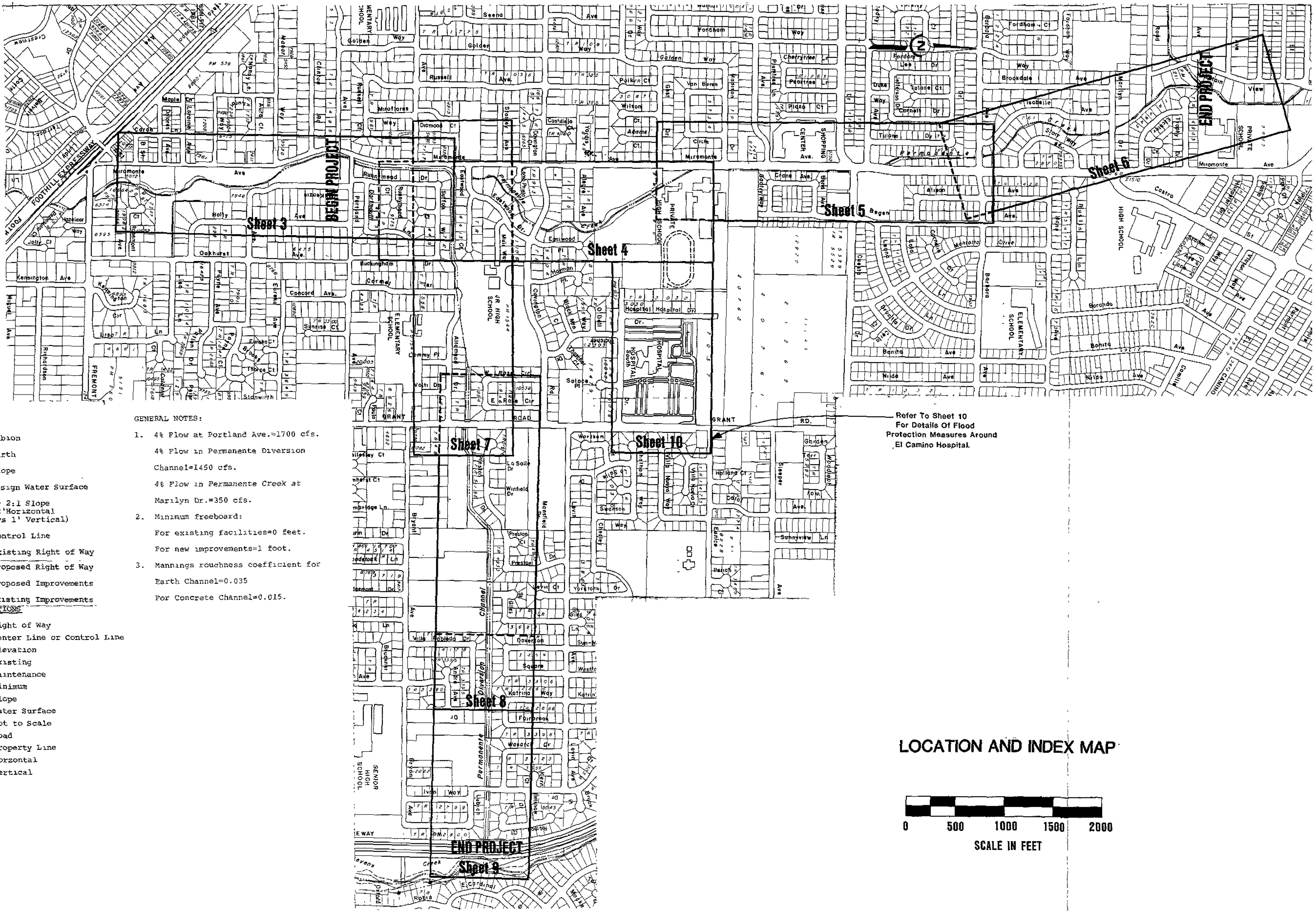
REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

PROJECT APPROVAL

George Korbay
DESIGN AND CONSTRUCTION MANAGER

Lloyd C. Fowler
CHIEF ENGINEER

DATE 7 May '79



Refer To Sheet 10 For Details Of Flood Protection Measures Around El Camino Hospital.

LOCATION AND INDEX MAP

LEGEND

- ▨ Gabion
- Earth
- Slope
- Design Water Surface
- or 2:1 Slope (2'Horizontal vs 1' Vertical)
- Control Line
- Existing Right of Way
- Proposed Right of Way
- Proposed Improvements
- Existing Improvements

ABBREVIATIONS

R/W	Right of Way
℄	Center Line or Control Line
Elev.	Elevation
Exist.	Existing
Maint.	Maintenance
Min.	Minimum
S	Slope
W.S.	Water Surface
N.T.S.	Not to Scale
Rd.	Road
P/L	Property Line
H	Horzontal
V	Vertical

GENERAL NOTES:

1. 4% Flow at Portland Ave.=1700 cfs.
   4% Flow in Permanente Diversion Channel=1450 cfs.
   4% Flow in Permanente Creek at Marilyn Dr.=350 cfs.
2. Minimum freeboard:
   For existing facilities=0 feet.
   For new improvements=1 foot.
3. Mannings rouchness coefficient for Earth Channel=0.035
   For Concrete Channel=0.015.

REV.	DESCRIPTION	DATE	APPR

REFERENCE INFORMATION AND NOTES

REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

DATE May 2, 1979
DESIGN D.K. Tuan
DRAWN A. Schranz FSW
CHECKED J.P./L.P.

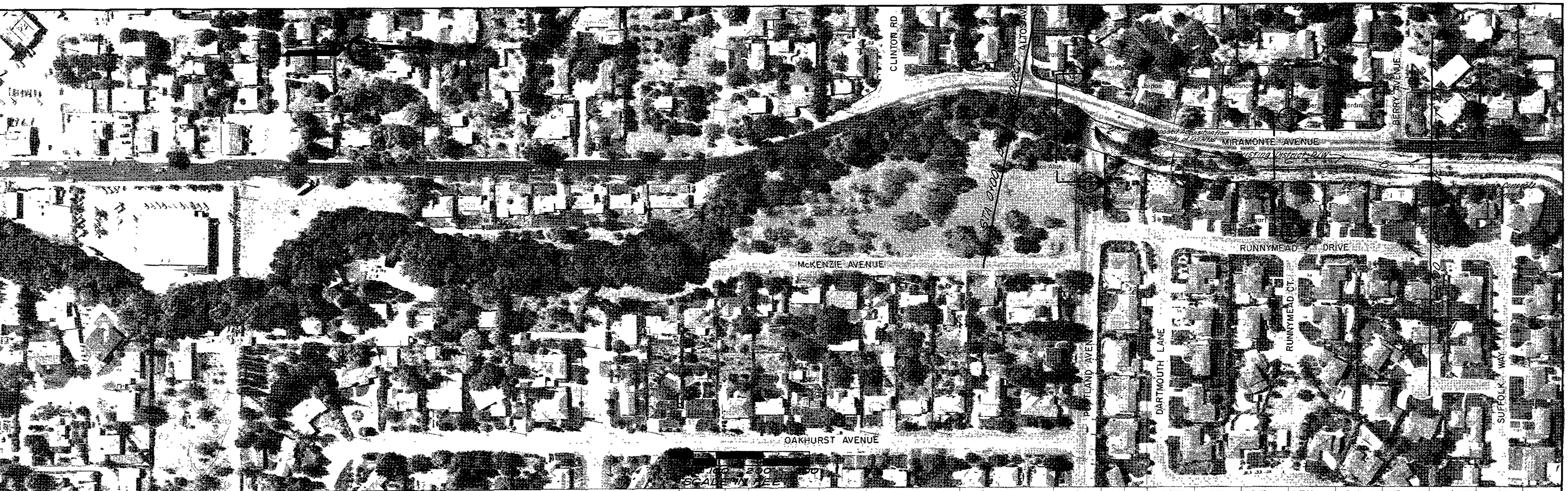
Santa Clara Valley Water District

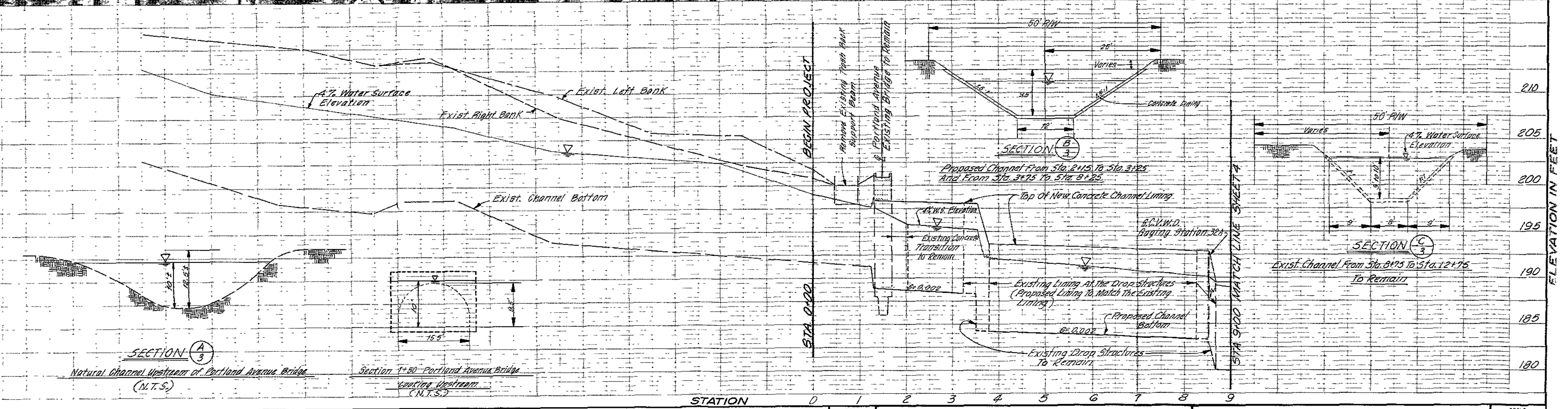
ENGINEERING CERTIFICATION
PROJECT ENGINEER R.C.E. NO. 19214
DIVISION ENGINEER R.C.E. NO. 21812

ENGINEERING APPROVAL
John L. Richardson
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

PERMANENTE CREEK AND PERMANENTE DIVERSION

SCALE As Shown
SHEET 2 OF 10




4% Water Surface Elevation
Exist. Left Bank
Exist. Right Bank
Exist. Channel Bottom
BEGIN PROJECT
STA. 0+00
Remove Existing Trash Rack Support Beam
℄ Portland Avenue Existing Bridge To Remain
50' R/W
25'
Varies
9.5'
1.5:1
12'
Concrete Lining
SECTION B/3
Proposed Channel From Sta. 2+15 To Sta. 3+25 And From Sta. 3+75 To Sta. 8+25
Top Of New Concrete Channel Lining
4% W.S. Elevation
Existing Concrete Transition To Remain
S=0.002
Existing Lining At The Drop Structures (Proposed Lining To Match The Existing Lining)
Proposed Channel Bottom
S=0.002
Existing Drop Structures To Remain
S.C.V.W.D. Gaging Station 32A
STA 9+00 MATCH LINE SHEET 4
50' R/W
Varies
4% Water Surface Elevation
9' to 10'
1:1
9'
8'
9'
SECTION C/3
Exist. Channel From Sta. 8+75 To Sta. 12+75 To Remain
10'±
12.5'±
SECTION A/3
Natural Channel Upstream Of Portland Avenue Bridge
(N.T.S.)
10'
9.5'
15.5'
Section 1+50 Portland Avenue Bridge Looking Upstream
(N.T.S.)
210
205
200
195
190
185
180
ELEVATION IN FEET
STATION
0
1
2
3
4
5
6
7
8
9

REFER TO TRACING FOR LATEST REVISION		
DESCRIPTION	SUB	APPR

REFERENCE INFORMATION AND NOTES

DATE OF PHOTOGRAPHY. 10-16-75

REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

PREPARED BY: EARTHDATA, INC

DATE May 2, 1979
DESIGN D K Tuan
DRAWN Seifert & Hill FSW
CHECKED J P/L. P.

Santa Clara Valley Water District

ENGINEERING CERTIFICATION
Bandt
PROJECT ENGINEER R.C.E. NO. 19214
Larry G. Preston
DIVISION ENGINEER R.C.E. NO. 21812

ENGINEERING APPROVAL
HEAD PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

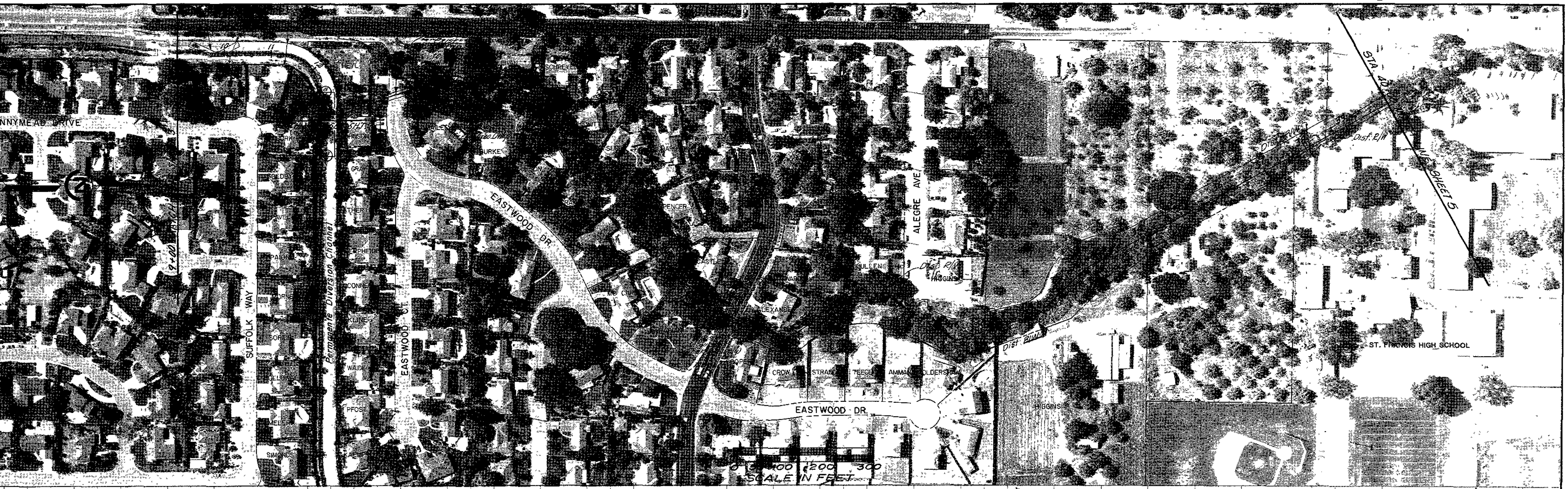
MAP AND GENERAL PLANS

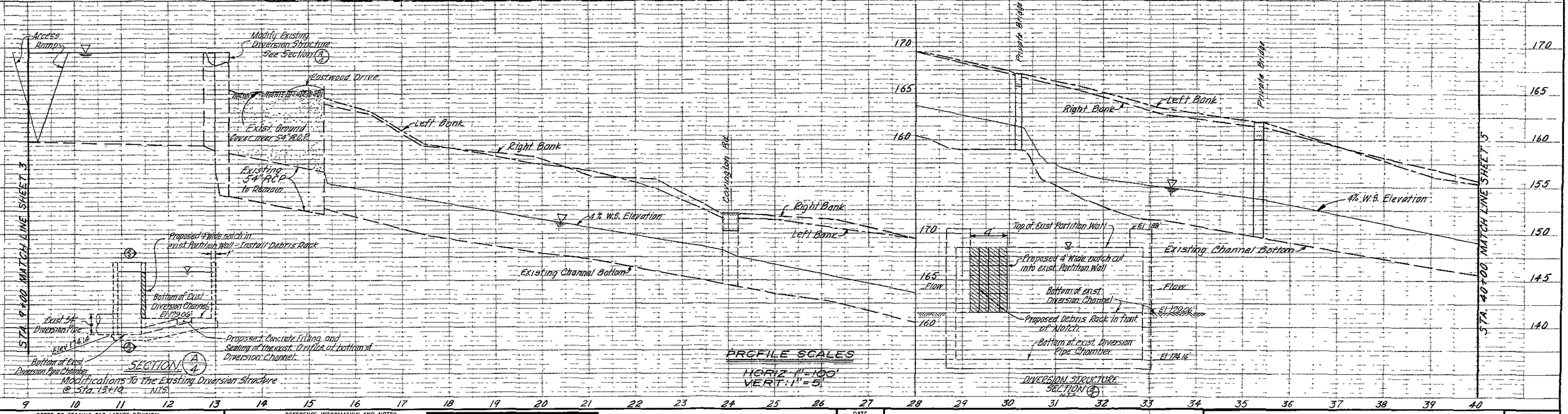
ZONE NW - 1 PROJECT NO. 1024

PERMANENTE CREEK

SCALE 1" = 100'

SHEET **3** OF 10




Access Ramps
Modify Existing Diversion Structure See Section A/4
Eastwood Drive
Exist. Ground Cover over 54" R.C.P.
Existing 54" RCP to Remain
Left Bank
Right Bank
4% W.S. Elevation
Existing Channel Bottom
Carrington Rd.
Right Bank
Left Bank
Private Bridge
Private Bridge
Right Bank
Left Bank
4% W.S. Elevation
Existing Channel Bottom
STA. 9+00 MATCH LINE SHEET 3
STA. 40+00 MATCH LINE SHEET 5
170
165
160
155
150
145
140
ELEVATION IN FEET
Proposed 4' wide notch in exist. Partition Wall - Install Debris Rack
1'
Bottom of Exist. Diversion Channel El. 179.06'
Exist. 54" Diversion Pipe
Elev. 174.14
Bottom of Exist. Diversion Pipe Chamber
Proposed Concrete Filling and Sealing of the exist. Orifice at bottom of Diversion Channel.
B/4
SECTION A/4
Modifications To The Existing Diversion Structure @ Sta. 13+10 NTS
PROFILE SCALES
HORIZ. 1"=100'
VERT. 1"=5'
170
165
160
Flow
4'
Top of Exist. Partition Wall
El. 188'
Proposed 4' wide notch cut into exist. Partition Wall
Bottom of exist. Diversion Channel
El. 179.06'
Flow
Proposed Debris Rack in front of Notch
Bottom of exist. Diversion Pipe Chamber
El. 174.16'
DIVERSION STRUCTURE SECTION B/4 NTS
9
10
11
12
13
14
15
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DRAWN Seifert & Hill ESW
CHECKED J.P./L.P.

Santa Clara Valley Water District

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ENGINEERING APPROVAL
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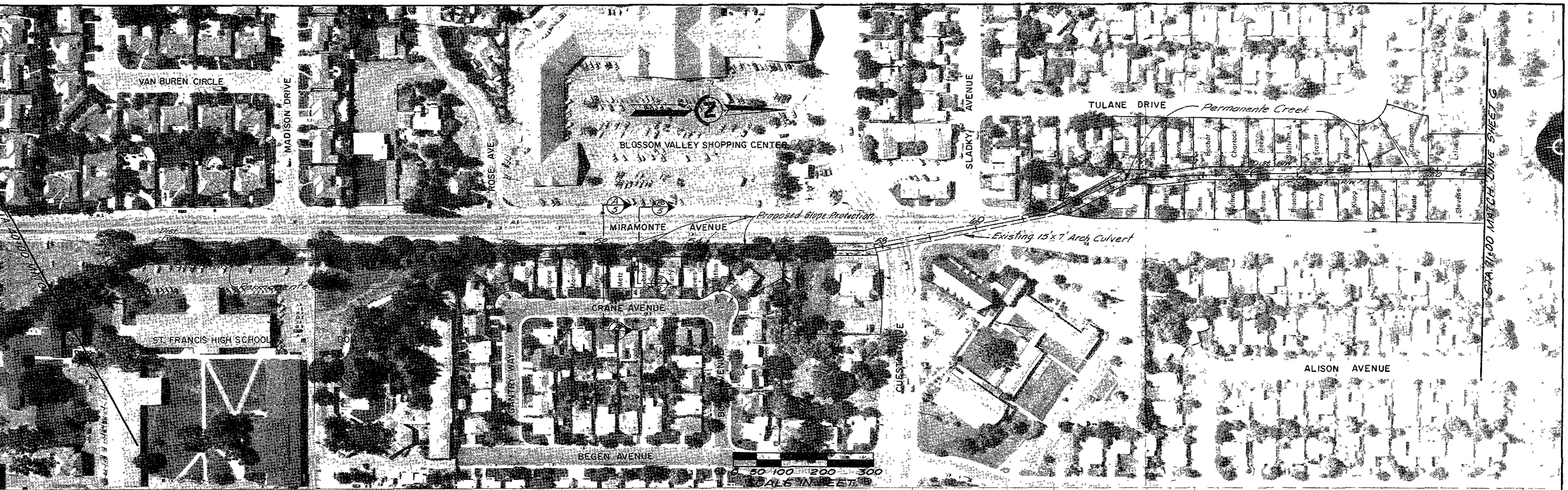
MAP AND GENERAL PLANS

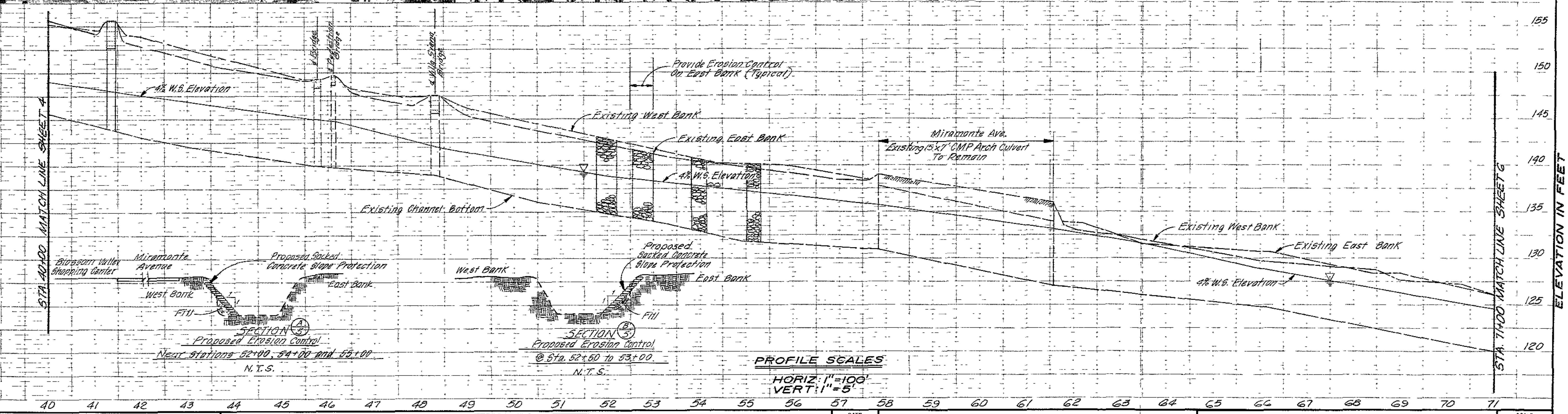
ZONE NW-1 PROJECT NO. 1024

PERMANENTE CREEK

SCALE 1" = 100'

SHEET 4 OF 10





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Santa Clara Valley Water District

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DIVISION ENGINEER R.C.E. NO.

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HEAD PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

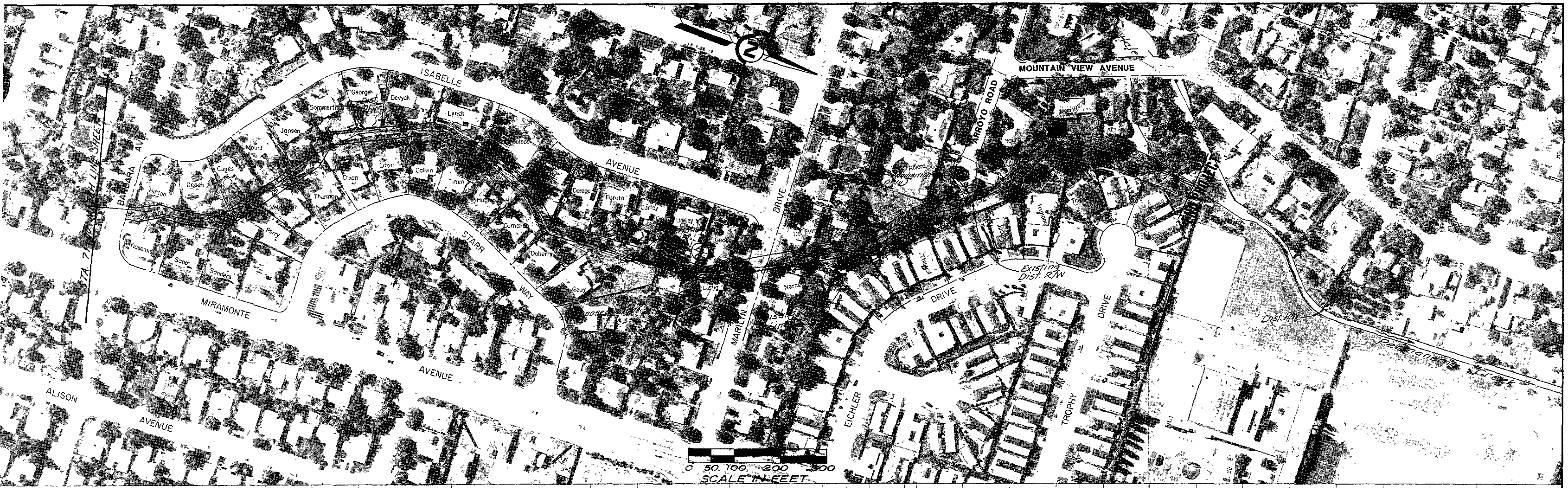
MAP AND GENERAL PLANS

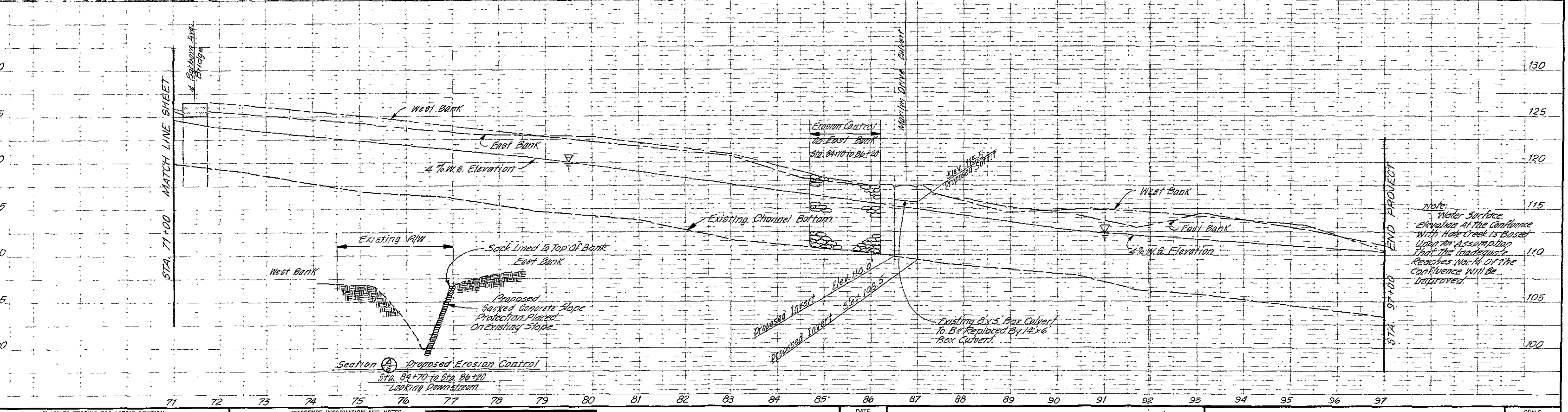
ZONE NW-1 PROJECT NO. 1024

PERMANENTE CREEK

SCALE 1" = 100'

SHEET 5 OF 10




@ Barbara Ave. Bridge
STA. 71+00 MATCH LINE SHEET
West Bank
East Bank
4% W.S. Elevation
Existing Channel Bottom
Erosion Control On East Bank Sta. 84+70 to 86+20
Marilyn Drive Culvert
Elev. 115.5' Proposed Soffit
Proposed Invert Elev. 110.0
Proposed Invert Elev. 109.5
Existing 8'x5' Box Culvert To Be Replaced By 14'x6' Box Culvert
West Bank
East Bank
4% W.S. Elevation
STA. 97+00 END PROJECT
Note: Water Surface Elevation At The Confluence With Hale Creek Is Based Upon An Assumption That The Inadequate Reaches North Of The Confluence Will Be Improved.
Existing R/W
West Bank
Sack Lined To Top Of Bank
East Bank
Proposed Sacked Concrete Slope Protection Placed On Existing Slope
Section (A/6) Proposed Erosion Control Sta. 84+70 to Sta. 86+20 Looking Downstream
130
125
120
115
110
105
100
71
72
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75
76
77
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DESCRIPTION	SUB	APPR

REFERENCE INFORMATION AND NOTES

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PREPARED BY. EARTHDATA, INC

DATE May 2, 1979
DESIGN D. Tuan
DRAWN L. Hill
CHECKED J P/L P

Santa Clara Valley Water District

ENGINEERING CERTIFICATION
PROJECT ENGINEER R.C.E. NO. 1944
DIVISION ENGINEER R.C.E. NO.

ENGINEERING APPROVAL
HEAD PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

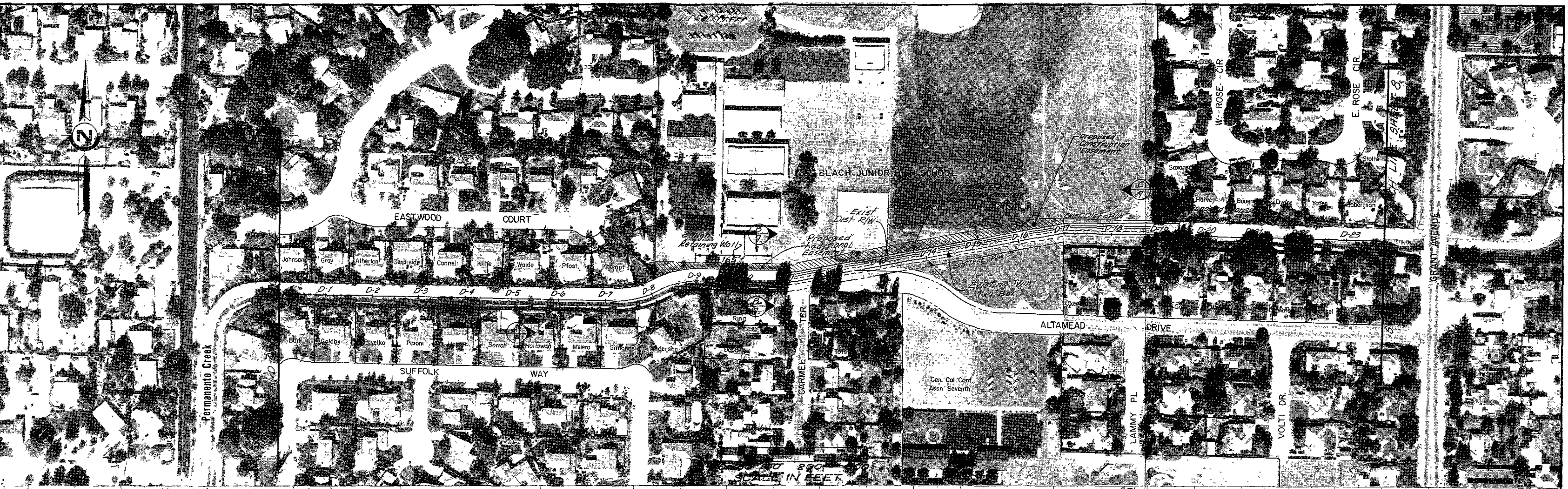
MAP AND GENERAL PLANS

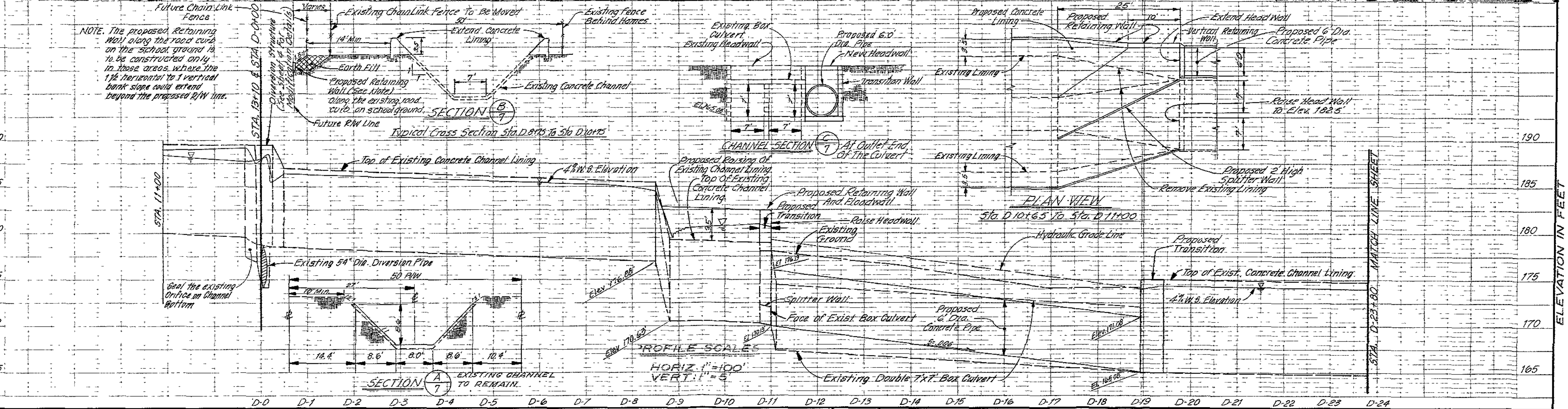
ZONE NW-1 PROJECT NO. 1024

PERMANENTE CREEK

SCALE 1" = 100'
SHEET 6 OF 10

579-8




Future Chain Link Fence
Varies
Existing ChainLink Fence To Be Moved
50'
Existing Fence Behind Homes
14' Min
Extend Concrete Lining
3.5'
Earth Fill
Proposed Retaining Wall (See Note) along the existing road curb on school ground.
7'
Existing Concrete Channel
Future R/W Line
SECTION B/7
Typical Cross Section Sta.D 8+75 To Sta D 10+75
STA. 13+10 & STA. D-0+00
Diversion Structure (See Sheet 4 For Modification Details)
Existing Box Culvert
Existing Headwall
Proposed 6.0' Dia. Pipe
New Headwall
Transition Wall
7'
7'
CHANNEL SECTION C/7 At Outlet End Of The Culvert
Proposed Concrete Lining
Proposed Retaining Wall
25'
10'
Extend Head Wall
Vertical Retaining Wall
Proposed 6' Dia. Concrete Pipe
Existing Lining
Raise Head Wall To Elev. 182.5
Existing Lining
Proposed 2' High Splitter Wall
Remove Existing Lining
PLAN VIEW
Sta. D 10+65 To Sta. D 11+00
Top of Existing Concrete Channel Lining
4% W.S. Elevation
Proposed Raising Of Existing Channel Lining
Top Of Existing Concrete Channel Lining
Proposed Retaining Wall And Headwall
Proposed Transition
Raise Headwall
Existing Ground
Hydraulic Grade Line
Proposed Transition
Top of Exist. Concrete Channel Lining
4% W.S. Elevation
STA. 11+00
Existing 54" Dia. Diversion Pipe
Seal the existing Orifice on Channel Bottom
50 R/W
27'
10' Min
13'
8.6'
14.4'
8.6'
8.0'
8.6'
10.4'
SECTION A/7
EXISTING CHANNEL TO REMAIN
Elev 176.85
Elev 170.63
El 170.15
El 176.15
Splitter Wall
Face of Exist. Box Culvert
Proposed 6' Dia. Concrete Pipe
S=.006
Elev 171.08
El 165.08
Existing Double 7'x7' Box Culvert
PROFILE SCALES
HORIZ. 1"=100'
VERT. 1"=5'
STA. D-23+80 MATCH LINE SHEET 8
190
185
180
175
170
165
ELEVATION IN FEET
D-0
D-1
D-2
D-3
D-4
D-5
D-6
D-7
D-8
D-9
D-10
D-11
D-12
D-13
D-14
D-15
D-16
D-17
D-18
D-19
D-20
D-21
D-22
D-23
D-24

NOTE. The proposed Retaining Wall along the road curb on the school ground is to be constructed only in those areas where the 1½ horizontal to 1 vertical bank slope could extend beyond the proposed R/W line.

REFER TO TRACING FOR LATEST REVISION		
DESCRIPTION	SUB	APPR

REFERENCE INFORMATION AND NOTES

DATE OF PHOTOGRAPHY 10-16-75

REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

PREPARED BY: EARTHDATA, INC

DATE May 2, 1979
DESIGN D.K. Tuan
DRAWN Levi Hill
CHECKED J.P / L.P

Santa Clara Valley Water District

ENGINEERING CERTIFICATION
PROJECT ENGINEER R.C.E. NO 19214
Larry R. Vrestar
DIVISION ENGINEER R.C.E. NO 21082

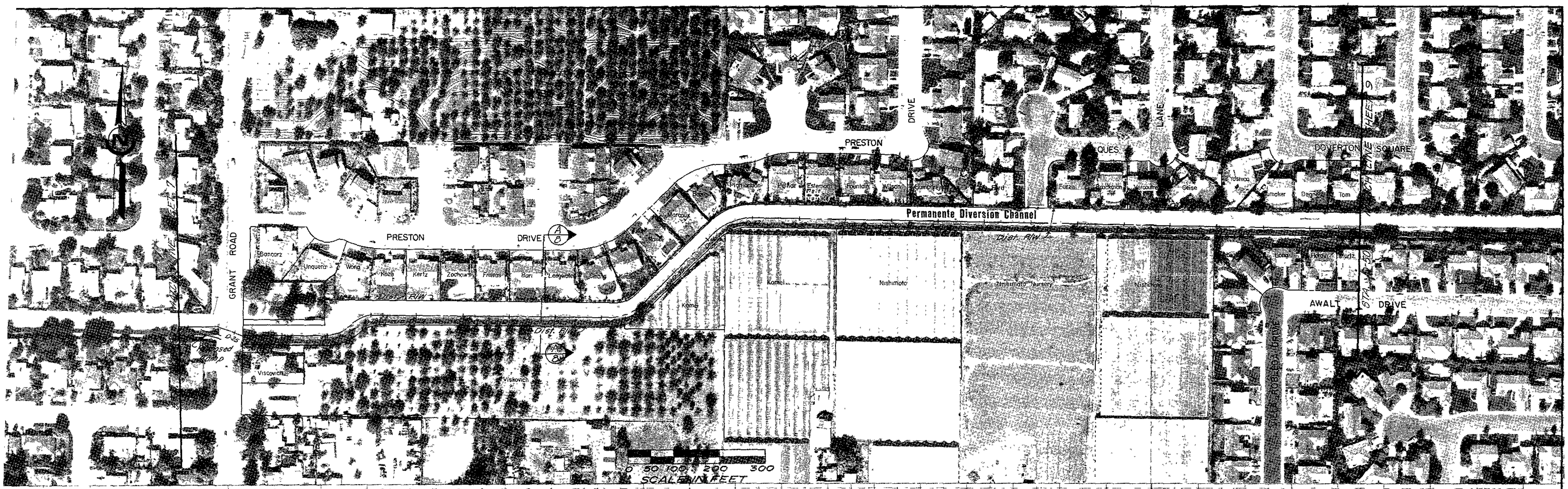
ENGINEERING APPROVAL
HEAD PROJECT DEVELOPMENT BRANCH R.C.E. NO 17646

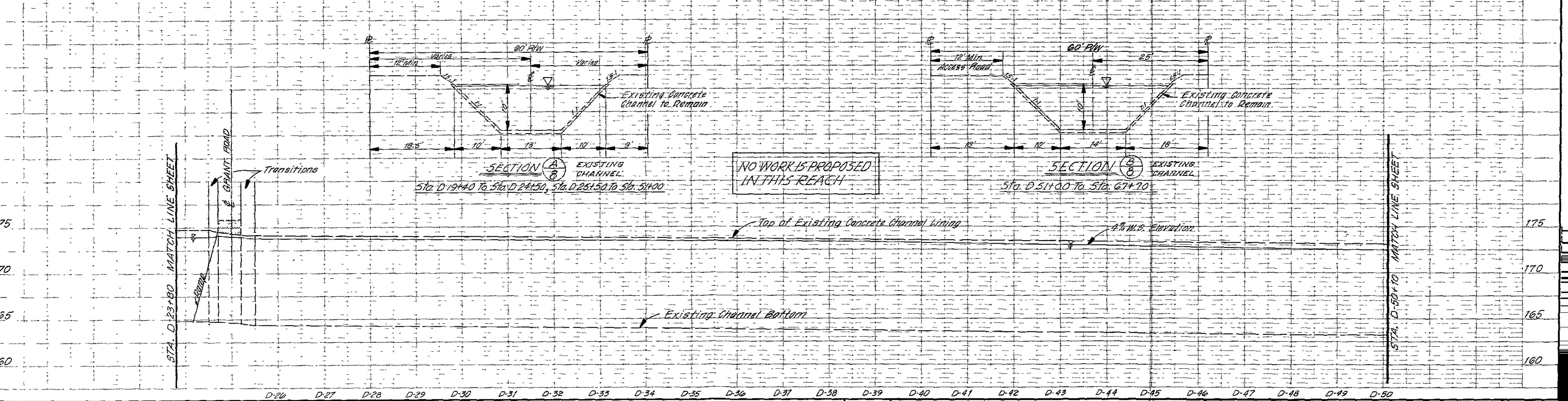
MAP AND GENERAL PLANS

ZONE NW-1 (NORTHWEST) PROJECT NO. 1023

PERMANENTE DIVERSION

SCALE 1" = 100' C.I. 2'
SHEET 7 OF 10




℞
60' R/W
Varies
12' Min
Varies
1.5:1
1:1
10'
18.5'
10'
13'
10'
9'
Existing Concrete Channel to Remain
SECTION A/8 EXISTING CHANNEL
Sta. D 19+40 To Sta. D 24+50, Sta. D 25+50 To Sta. 51+00
NO WORK IS PROPOSED IN THIS REACH
60' R/W
12' Min Access Road
25'
1.5:1
1:1
10'
18'
10'
14'
18'
Existing Concrete Channel to Remain
SECTION B/8 EXISTING CHANNEL
Sta. D 51+00 To Sta. 67+70
Transitions
℄ GRANT ROAD
Ramp
STA. D 23+80 MATCH LINE SHEET
Top of Existing Concrete Channel Lining
4% W.S. Elevation
Existing Channel Bottom
STA. D-50+10 MATCH LINE SHEET
175
170
165
160
175
170
165
160
D-26
D-27
D-28
D-29
D-30
D-31
D-32
D-33
D-34
D-35
D-36
D-37
D-38
D-39
D-40
D-41
D-42
D-43
D-44
D-45
D-46
D-47
D-48
D-49
D-50

REFER TO TRACING FOR LATEST REVISION

REV	DESCRIPTION	SUB	APPR

REFERENCE INFORMATION AND NOTES

DATE OF PHOTOGRAPHY 10-16-75

REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

PREPARED BY: EARTHDATA, INC

DATE May 2, 1979
DESIGN O.K. Tuan
DRAWN L. Hill
CHECKED J P / L P.

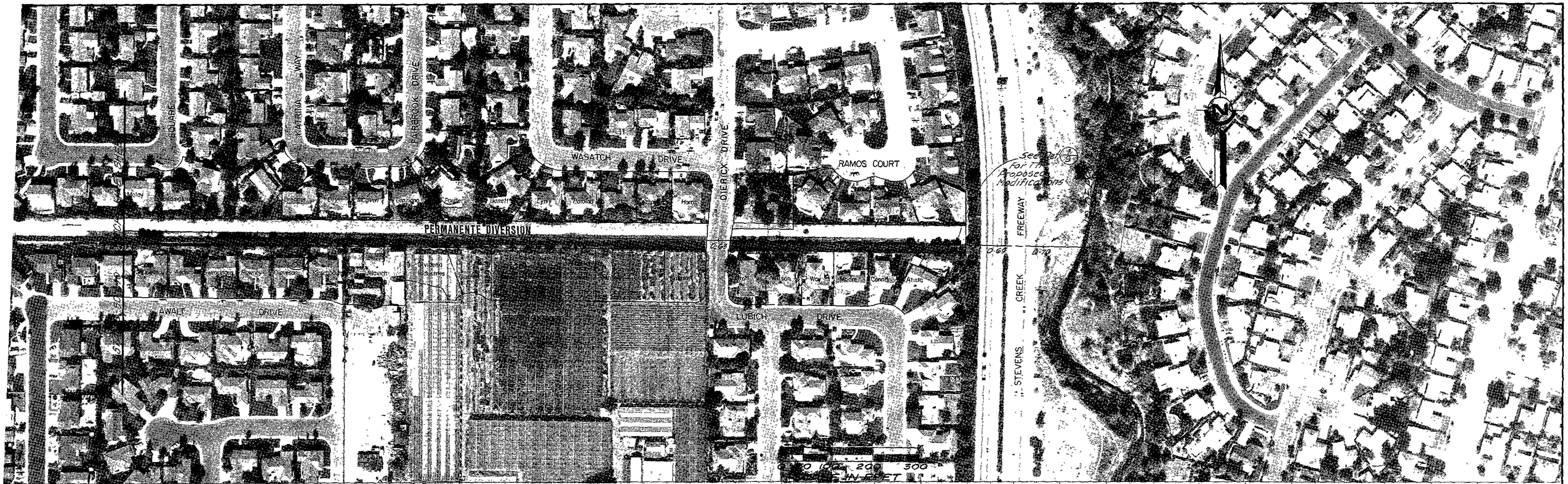
Santa Clara Valley Water District

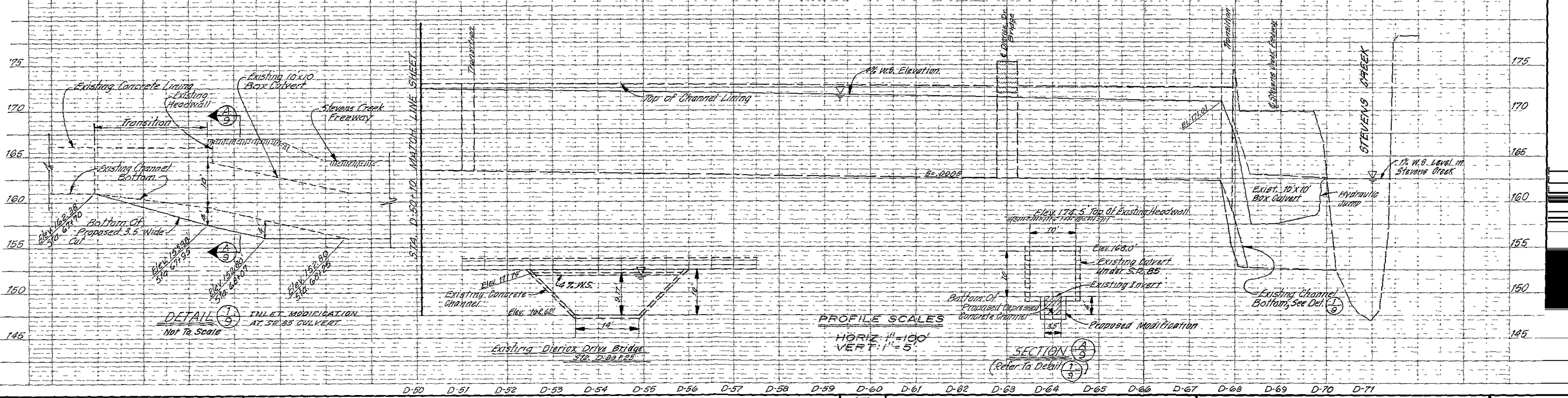
ENGINEERING CERTIFICATION
PROJECT ENGINEER R.C.E. NO. 19214
Larry D Thielen
DIVISION ENGINEER R.C.E. NO. 21912

ENGINEERING APPROVAL
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

MAP AND GENERAL PLANS
ZONE NW-1 (NORTHWEST) PROJECT NO. 1023
PERMANENTE DIVERSION

SCALE 1" = 100'
C.I. 2'
SHEET 8 OF 10





REFER TO TRACING FOR LATEST REVISION

REV	DESCRIPTION	SUB	APPR

REFERENCE INFORMATION AND NOTES

DATE OF PHOTOGRAPHY 10-10-75

REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

PREPARED BY: EARTHDATA, INC

DATE May 2, 1979
DESIGN D.K. Tuan
DRAWN L. Hill
CHECKED J P / L P.

Santa Clara Valley Water District

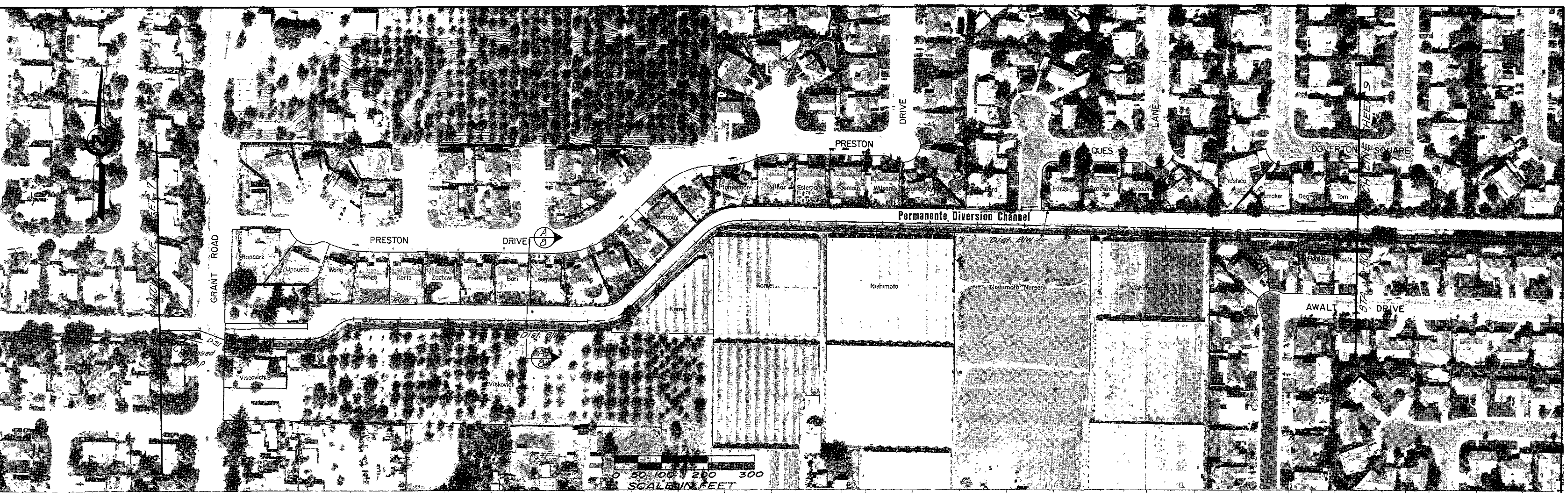
ENGINEERING CERTIFICATION
PROJECT ENGINEER R.C.E. NO. 19214
Larry N. Tuason
DIVISION ENGINEER R.C.E. NO. 21912

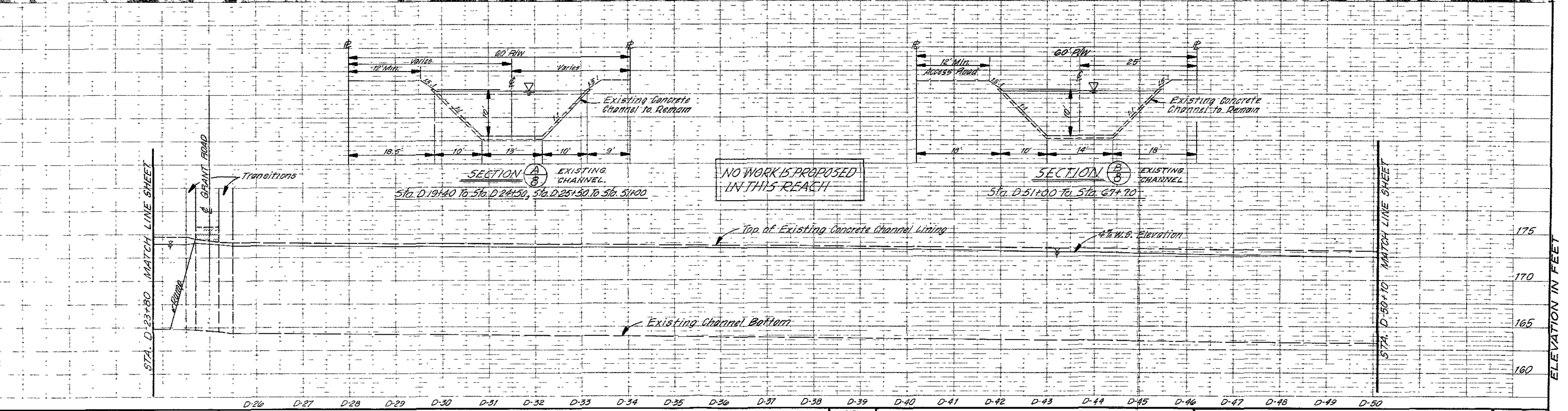
ENGINEERING APPROVAL
HEAD PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

MAP AND GENERAL PLANS
ZONE NW-1 (NORTHWEST) PROJECT NO. 1023
PERMANENTE DIVERSION

SCALE 1" = 100' C.I. 2'
SHEET 9 OF 10

JOB NO. ET9-8




R/W 60' R/W
Varies
12' Min.
Varies
1.5:1
1:1
10'
Existing Concrete Channel to Remain
18.5' 10' 13' 10' 9'
SECTION A/8 EXISTING CHANNEL.
Sta. D 19+40 To Sta. D 24+50, Sta. D 25+50 To Sta. 51+00
NO WORK IS PROPOSED IN THIS REACH
60' R/W
12' Min. Access Road
25'
1.5:1
1:1
10'
Existing Concrete Channel to Remain
18' 10' 14' 18'
SECTION B/8 EXISTING CHANNEL
Sta. D 51+00 To Sta. 67+70
STA. D-23+80 MATCH LINE SHEET
GRANT ROAD
Transitions
Ramp
Top of Existing Concrete Channel Lining
4% W.S. Elevation
Existing Channel Bottom
STA. D-50+10 MATCH LINE SHEET
175
170
165
160
ELEVATION IN FEET
D-26 D-27 D-28 D-29 D-30 D-31 D-32 D-33 D-34 D-35 D-36 D-37 D-38 D-39 D-40 D-41 D-42 D-43 D-44 D-45 D-46 D-47 D-48 D-49 D-50

REFER TO TRACING FOR LATEST REVISION		
DESCRIPTION	SUB	APPR

REFERENCE INFORMATION AND NOTES

DATE OF PHOTOGRAPHY 10-16-75

REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

PREPARED BY: EARTHDATA, INC

DATE May 2, 1979
DESIGN D.K. Tuan
DRAWN L. Hill
CHECKED J.P./L.P.

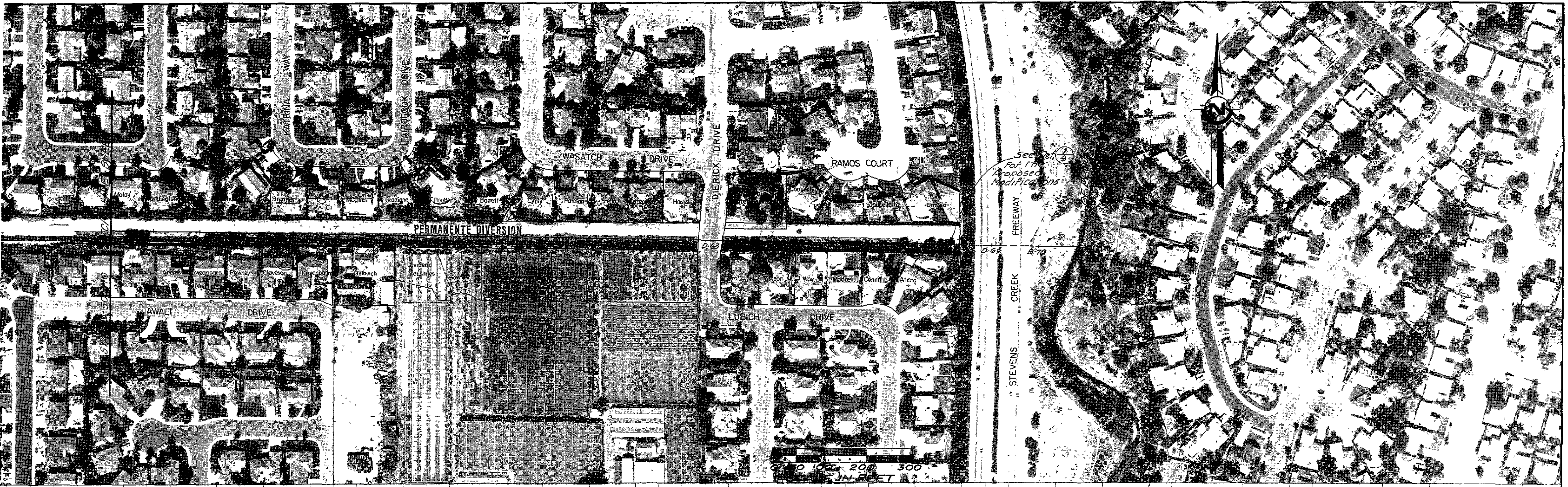
Santa Clara Valley Water District

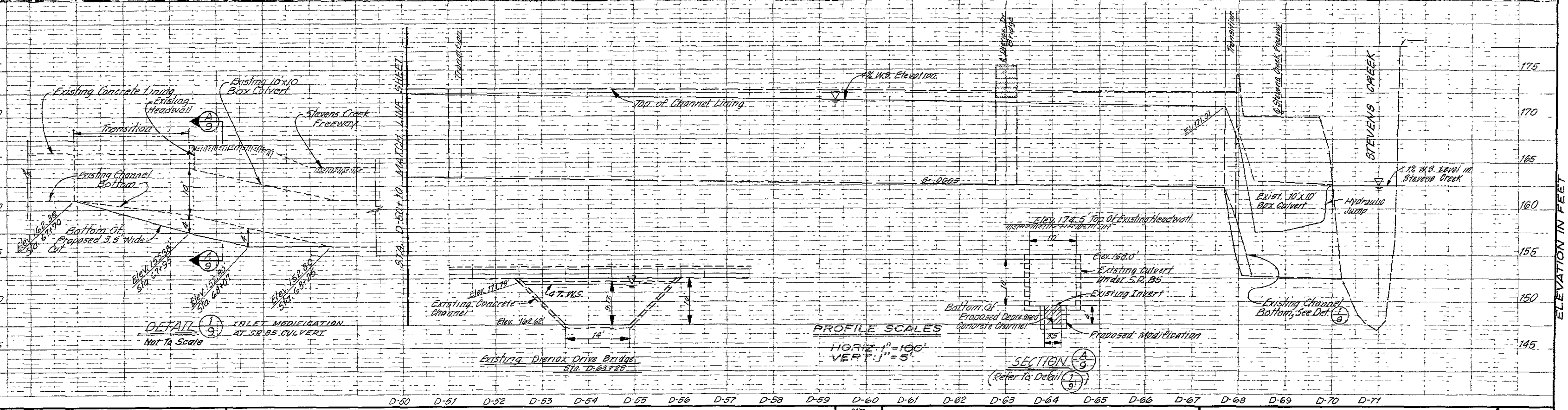
ENGINEERING CERTIFICATION
PROJECT ENGINEER R.C.E. NO 19214
DIVISION ENGINEER R.C.E. NO 21812

ENGINEERING APPROVAL
HEAD PROJECT DEVELOPMENT BRANCH R.C.E. NO 17646

MAP AND GENERAL PLANS
ZONE NW-1 (NORTHWEST) PROJECT NO. 1023
PERMANENTE DIVERSION

SCALE 1" = 100' C.I. 2'
SHEET 8 OF 10





REFER TO TRACING FOR LATEST REVISION

DESCRIPTION	SUB	APPR

REFERENCE INFORMATION AND NOTES

DATE OF PHOTOGRAPHY 10-16-75

REDUCED PLAN
USE SCALE BELOW
0 1 2 3
3 INCHES ON ORIGINAL PLAN

PREPARED BY: EARTHDATA, INC.

DATE May 2, 1979
DESIGN D.K. Tuan
DRAWN L. Hill
CHECKED JP/LP

Santa Clara Valley Water District

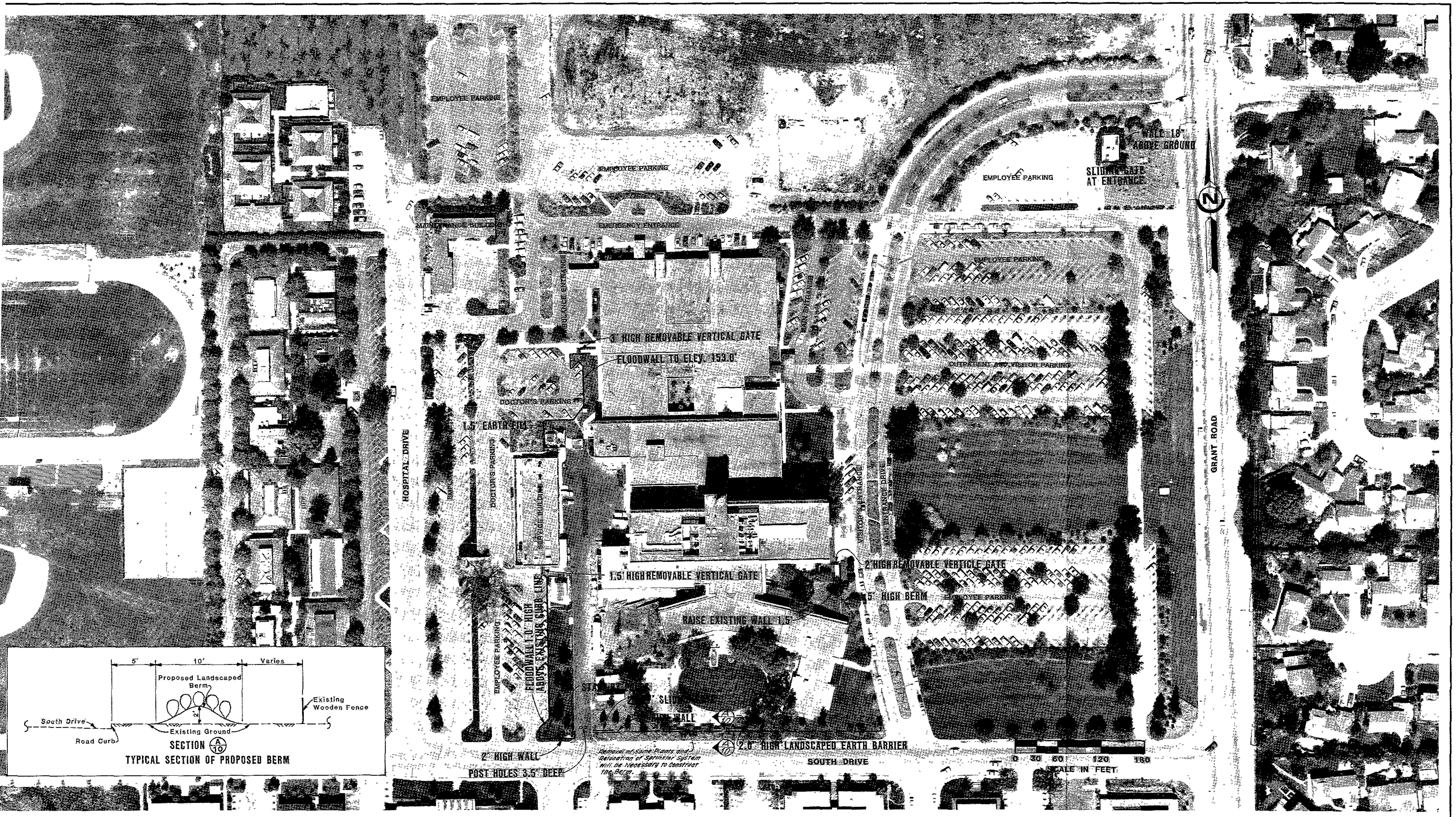
ENGINEERING CERTIFICATION
PROJECT ENGINEER R.C.E. NO. 9214
DIVISION ENGINEER R.C.E. NO. 21815

ENGINEERING APPROVAL
HEAD PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

MAP AND GENERAL PLANS
ZONE NW-1 (NORTHWEST) PROJECT NO. 1023
PERMANENTE DIVERSION

SCALE 1" = 100'
C.I. 2'
SHEET 9 OF 10

79-8



SECTION A/10

TYPICAL SECTION OF PROPOSED BERM

DESCRIPTION	DATE	APPR.
REDUCED PLAN USE SCALE BELOW 0 1 2 3 3 INCHES ON ORIGINAL PLAN		

REFERENCE INFORMATION AND NOTES

1. 10' Wide Permanent Easement will be Acquired for the Proposed Flood Walls (5' on Each Side of the Wall).
2. 20' Wide Permanent Easement will be Acquired for the Proposed Berms (10' on Each Side of the ℄).
3. Temporary Easement or Permit will be Obtained from the Hospital Authorities for the Use of Necessary Areas and Facilities to Build the Proposed Measures.

PHOTOGRAPHY BY AIR-PHOTO CO., INC

DATE 3-25-78

RECTIFICATION BY AIR-PHOTO CO., INC.

DATE May 2, 1979
DESIGN DKT./J.P.
DRAWN mv FSW
CHECKED J.P./L.P.

Santa Clara Valley Water District

ENGINEERING CERTIFICATION
PROJECT ENGINEER R.C.E. NO. 19214
DIVISION ENGINEER R.C.E. NO. 21812

ENGINEERING APPROVAL
HEAD, PROJECT DEVELOPMENT BRANCH R.C.E. NO. 17646

GENERAL PLAN FOR FLOOD PROTECTION MEASURES AT EL CAMINO HOSPITAL

ZONE NW-1 (NORTHWEST) PROJECT NO. 1023

PERMANENTE DIVERSION

SCALE AS SHOWN

SHEET 10 OF 10